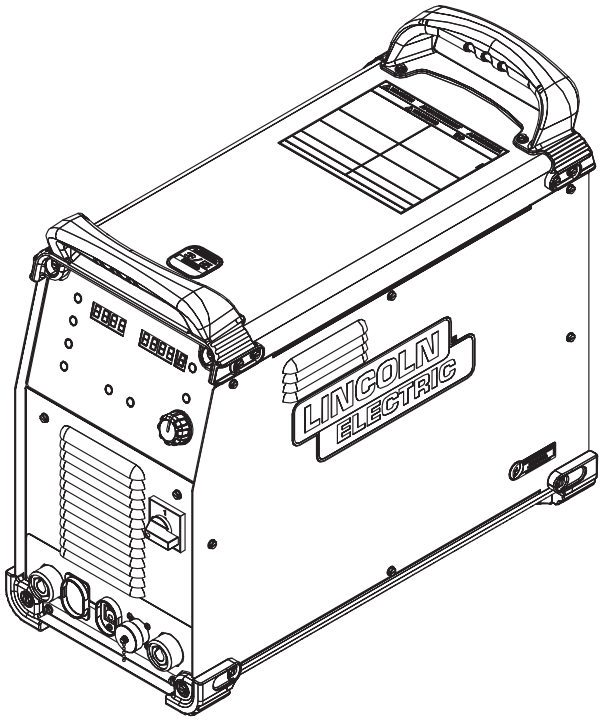
NOTE: This manual will cover most of the troubleshooting and repair procedures for the code numbers listed. Some variances may exist when troubleshooting/repairing later code numbers.

ASPECT™ 375

For use with machines having Code Numbers:
12165

SERVICE MANUAL



SVM256 | Issue Date 15-Jul

THE LINCOLN ELECTRIC COMPANY
22801 St. Clair Avenue • Cleveland, OH • 44117-1199 • U.S.A.
Phone: +1.216.481.8100 • www.lincolnelectric.com

SAFETY DEPENDS ON YOU

Service and repair should be performed by only Lincoln Electric Factory Trained Personnel. Unauthorized repairs performed on this equipment may result in danger to the technician and machine operator and will invalidate your factory warranty. For your safety and to avoid Electrical Shock, please observe all safety notes and precautions detailed throughout this manual.

⚠ WARNING

This statement appears where the information must be followed exactly to avoid serious personal injury or loss of life.

⚠ CAUTION

This statement appears where the information must be followed to avoid minor personal injury or damage to this equipment.

KEEP YOUR HEAD OUT OF THE FUMES.

DON'T get too close to the arc. Use corrective lenses if necessary to stay a reasonable distance away from the arc.

READ and obey the Material Safety Data Sheet (MSDS) and the warning label that appears on all containers of welding materials.

USE ENOUGH VENTILATION or exhaust at the arc, or both, to keep the fumes and gases from your breathing zone and the general area.

IN A LARGE ROOM OR OUTDOORS, natural ventilation may be adequate if you keep your head out of the fumes (See below).

USE NATURAL DRAFTS or fans to keep the fumes away from your face.

If you develop unusual symptoms, see your supervisor. Perhaps the welding atmosphere and ventilation system should be checked.

WEAR CORRECT EYE, EAR & BODY PROTECTION

PROTECT your eyes and face with welding helmet properly fitted and with proper grade of filter plate (See ANSI Z49.1).

PROTECT your body from welding spatter and arc flash with protective clothing including woolen clothing, flame-proof apron and gloves, leather leggings, and high boots.

PROTECT others from splatter, flash, and glare with protective screens or barriers.

IN SOME AREAS, protection from noise may be appropriate.

BE SURE protective equipment is in good condition.

Also, wear safety glasses in work area AT ALL TIMES.

SPECIAL SITUATIONS

DO NOT WELD OR CUT containers or materials which previously had been in contact with hazardous substances unless they are properly cleaned. This is extremely dangerous.

DO NOT WELD OR CUT painted or plated parts unless special precautions with ventilation have been taken. They can release highly toxic fumes or gases.

Additional precautionary measures

PROTECT compressed gas cylinders from excessive heat, mechanical shocks, and arcs; fasten cylinders so they cannot fall.

BE SURE cylinders are never grounded or part of an electrical circuit.

REMOVE all potential fire hazards from welding area.

ALWAYS HAVE FIRE FIGHTING EQUIPMENT READY FOR IMMEDIATE USE AND KNOW HOW TO USE IT.

SECTION A: WARNINGS

CALIFORNIA PROPOSITION 65 WARNINGS

Diesel Engines

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

Gasoline Engines

The engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.

ARC WELDING CAN BE HAZARDOUS. PROTECT YOURSELF AND OTHERS FROM POSSIBLE SERIOUS INJURY OR DEATH. KEEP CHILDREN AWAY. PACEMAKER WEARERS SHOULD CONSULT WITH THEIR DOCTOR BEFORE OPERATING.

Read and understand the following safety highlights. For additional safety information, it is strongly recommended that you purchase a copy of "Safety in Welding & Cutting - ANSI Standard Z49.1" from the American Welding Society, P.O. Box 351040, Miami, Florida 33135 or CSA Standard W117.2-1974. A Free copy of "Arc Welding Safety" booklet E205 is available from the Lincoln Electric Company, 22801 St. Clair Avenue, Cleveland, Ohio 44117-1199.

BE SURE THAT ALL INSTALLATION, OPERATION, MAINTENANCE AND REPAIR PROCEDURES ARE PERFORMED ONLY BY QUALIFIED INDIVIDUALS.

FOR ENGINE POWERED EQUIPMENT.

1.a. Turn the engine off before troubleshooting and maintenance work unless the maintenance work requires it to be running.

1.b. Operate engines in open, well-ventilated areas or vent the engine exhaust fumes outdoors.

1.c. Do not add the fuel near an open flame welding arc or when the engine is running. Stop the engine and allow it to cool before refueling to prevent spilled fuel from vaporizing on contact with hot engine parts and igniting. Do not spill fuel when filling tank. If fuel is spilled, wipe it up and do not start engine until fumes have been eliminated.

1.d. Keep all equipment safety guards, covers and devices in position and in good repair.Keep hands, hair, clothing and tools away from V-belts, gears, fans and all other moving parts when starting, operating or repairing equipment.

1.e. In some cases it may be necessary to remove safety guards to perform required maintenance. Remove guards only when necessary and replace them when the maintenance requiring their removal is complete. Always use the greatest care when working near moving parts.

1.f. Do not put your hands near the engine fan. Do not attempt to override the governor or idler by pushing on the throttle control rods while the engine is running.

1.g. To prevent accidentally starting gasoline engines while turning the engine or welding generator during maintenance work, disconnect the spark plug wires, distributor cap or magneto wire as appropriate.

1.h. To avoid scalding, do not remove the radiator pressure cap when the engine is hot.

ELECTRIC AND MAGNETIC FIELDS MAY BE DANGEROUS

2.a. Electric current flowing through any conductor causes localized Electric and Magnetic Fields (EMF). Welding current creates EMF fields around welding cables and welding machines

2.b. EMF fields may interfere with some pacemakers, and welders having a pacemaker should consult their physician before welding.

2.c. Exposure to EMF fields in welding may have other health effects which are now not known.

2.d. All welders should use the following procedures in order to minimize exposure to EMF fields from the welding circuit:

- 2.d.1. Route the electrode and work cables together - Secure them with tape when possible.
- 2.d.2. Never coil the electrode lead around your body.
- 2.d.3. Do not place your body between the electrode and work cables. If the electrode cable is on your right side, the work cable should also be on your right side.
- 2.d.4. Connect the work cable to the workpiece as close as possible to the area being welded.
- 2.d.5. Do not work next to welding power source.

ELECTRIC SHOCK CAN KILL.

3.a. The electrode and work (or ground) circuits are electrically "hot" when the welder is on. Do not touch these "hot" parts with your bare skin or wet clothing. Wear dry, hole-free gloves to insulate hands.

3.b. Insulate yourself from work and ground using dry insulation. Make certain the insulation is large enough to cover your full area of physical contact with work and ground.

In addition to the normal safety precautions, if welding must be performed under electrically hazardous conditions (in damp locations or while wearing wet clothing; on metal structures such as floors, gratings or scaffolds; when in cramped positions such as sitting, kneeling or lying, if there is a high risk of unavoidable or accidental contact with the workpiece or ground) use the following equipment:

- Semiautomatic DC Constant Voltage (Wire) Welder.
- DC Manual (Stick) Welder.
- AC Welder with Reduced Voltage Control.

3.c. In semiautomatic or automatic wire welding, the electrode, electrode reel, welding head, nozzle or semiautomatic welding gun are also electrically "hot".

3.d. Always be sure the work cable makes a good electrical connection with the metal being welded. The connection should be as close as possible to the area being welded.

3.e. Ground the work or metal to be welded to a good electrical (earth) ground.

3.f. Maintain the electrode holder, work clamp, welding cable and welding machine in good, safe operating condition. Replace damaged insulation.

3.g. Never dip the electrode in water for cooling.

3.h. Never simultaneously touch electrically "hot" parts of electrode holders connected to two welders because voltage between the two can be the total of the open circuit voltage of both welders.

3.i. When working above floor level, use a safety belt to protect yourself from a fall should you get a shock.

3.j. Also see Items 6.c. and 8.

ARC RAYS CAN BURN.

4.a. Use a shield with the proper filter and cover plates to protect your eyes from sparks and the rays of the arc when welding or observing open arc welding. Headshield and filter lens should conform to ANSI Z87. I standards.

4.b. Use suitable clothing made from durable flame-resistant material to protect your skin and that of your helpers from the arc rays.

4.c. Protect other nearby personnel with suitable, non-flammable screening and/or warn them not to watch the arc nor expose themselves to the arc rays or to hot spatter or metal.

FUMES AND GASES CAN BE DANGEROUS.

5.a. Welding may produce fumes and gases hazardous to health. Avoid breathing these fumes and gases. When welding, keep your head out of the fume. Use enough ventilation and/or exhaust at the arc to keep fumes and gases away from the breathing zone. **When welding with electrodes which require special ventilation such as stainless or hard facing (see instructions on container or MSDS) or on lead or cadmium plated steel and other metals or coatings which produce highly toxic fumes, keep exposure as low as possible and within applicable OSHA PEL and ACGIH TLV limits using local exhaust or mechanical ventilation. In confined spaces or in some circumstances, outdoors, a respirator may be required. Additional precautions are also required when welding on galvanized steel.**

5. b. The operation of welding fume control equipment is affected by various factors including proper use and positioning of the equipment, maintenance of the equipment and the specific welding procedure and application involved. Worker exposure level should be checked upon installation and periodically thereafter to be certain it is within applicable OSHA PEL and ACGIH TLV limits.

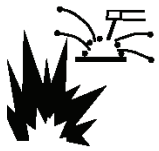
5.c. Do not weld in locations near chlorinated hydrocarbon vapors coming from degreasing, cleaning or spraying operations. The heat and rays of the arc can react with solvent vapors to form phosgene, a highly toxic gas, and other irritating products.

5.d. Shielding gases used for arc welding can displace air and cause injury or death. Always use enough ventilation, especially in confined areas, to insure breathing air is safe.

5.e. Read and understand the manufacturer's instructions for this equipment and the consumables to be used, including the material safety data sheet (MSDS) and follow your employer's safety practices. MSDS forms are available from your welding distributor or from the manufacturer.

5.f. Also see item 1.b.

WELDING AND CUTTING SPARKS CAN CAUSE FIRE OR EXPLOSION.



6.a. Remove fire hazards from the welding area. If this is not possible, cover them to prevent the welding sparks from starting a fire. Remember that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas. Avoid welding near hydraulic lines. Have a fire extinguisher readily available.

6.b. Where compressed gases are to be used at the job site, special precautions should be used to prevent hazardous situations. Refer to "Safety in Welding and Cutting" (ANSI Standard Z49.1) and the operating information for the equipment being used.

6.c. When not welding, make certain no part of the electrode circuit is touching the work or ground. Accidental contact can cause overheating and create a fire hazard.

6.d. Do not heat, cut or weld tanks, drums or containers until the proper steps have been taken to insure that such procedures will not cause flammable or toxic vapors from substances inside. They can cause an explosion even though they have been "cleaned". For information, purchase "Recommended Safe Practices for the Preparation for Welding and Cutting of Containers and Piping That Have Held Hazardous Substances", AWS F4.1 from the American Welding Society (see address above).

6.e. Vent hollow castings or containers before heating, cutting or welding. They may explode.

6.f. Sparks and spatter are thrown from the welding arc. Wear oil free protective garments such as leather gloves, heavy shirt, cuffless trousers, high shoes and a cap over your hair. Wear ear plugs when welding out of position or in confined places. Always wear safety glasses with side shields when in a welding area.

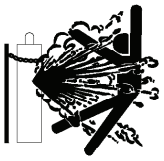
6.g. Connect the work cable to the work as close to the welding area as practical. Work cables connected to the building framework or other locations away from the welding area increase the possibility of the welding current passing through lifting chains, crane cables or other alternate circuits. This can create fire hazards or overheat lifting chains or cables until they fail.

6.h. Also see item 1.c.

6.I. Read and follow NFPA 51B " Standard for Fire Prevention During Welding, Cutting and Other Hot Work", available from NFPA, 1 Batterymarch Park, PO box 9101, Quincy, Ma 022690-9101.

6.j. Do not use a welding power source for pipe thawing.

CYLINDER MAY EXPLODE IF DAMAGED.



7.a. Use only compressed gas cylinders containing the correct shielding gas for the process used and properly operating regulators designed for the gas and pressure used. All hoses, fittings, etc. should be suitable for the application and maintained in good condition.

7.b. Always keep cylinders in an upright position securely chained to an undercarriage or fixed support.

7.c. Cylinders should be located:

- Away from areas where they may be struck or subjected to physical damage.
- A safe distance from arc welding or cutting operations and any other source of heat, sparks, or flame.

7.d. Never allow the electrode, electrode holder or any other electrically "hot" parts to touch a cylinder.

7.e. Keep your head and face away from the cylinder valve outlet when opening the cylinder valve.

7.f. Valve protection caps should always be in place and hand tight except when the cylinder is in use or connected for use.

7.g. Read and follow the instructions on compressed gas cylinders, associated equipment, and CGA publication P-I, "Precautions for Safe Handling of Compressed Gases in Cylinders," available from the Compressed Gas Association 1235 Jefferson Davis Highway, Arlington, VA 22202.

FOR ELECTRICALLY POWERED EQUIPMENT.

8.a. Turn off input power using the disconnect switch at the fuse box before working on the equipment.

8.b. Install equipment in accordance with the U.S. National Electrical Code, all local codes and the manufacturer's recommendations.

8.c. Ground the equipment in accordance with the U.S. National Electrical Code and the manufacturer's recommendations.

Refer to http://www.lincolnelectric.com/safety for additional safety information.

Welding Safety Interactive Web Guide for mobile devices

ELECTROMAGNETIC COMPATABILITY (EMC)

CONFORMANCE

Products displaying the CE mark are in conformity with European Community Council Directive of 3 May 1989 on the approximation of the laws of the Member States relating to electromagnetic compatibility (89/336/EEC). It was manufactured in conformity with a national standard that implements a harmonized standard: EN 60974-10 Electromagnetic Compatibility (EMC) Product Standard for Arc Welding Equipment. It is for use with other Lincoln Electric equipment. It is designed for industrial and professional use.

INTRODUCTION

All electrical equipment generates small amounts of electromagnetic emission. Electrical emission may be transmitted through power lines or radiated through space, similar to a radio transmitter. When emissions are received by other equipment, electrical interference may result. Electrical emissions may affect many kinds of electrical equipment; other nearby welding equipment, radio and TV reception, numerical controlled machines, telephone systems, computers, etc. Be aware that interference may result and extra precautions may be required when a welding power source is used in a domestic establishment.

INSTALLATION AND USE

The user is responsible for installing and using the welding equipment according to the manufacturer's instructions. If electromagnetic disturbances are detected then it shall be the responsibility of the user of the welding equipment to resolve the situation with the technical assistance of the manufacturer. In some cases this remedial action may be as simple as earthing (grounding) the welding circuit, see Note. In other cases it could involve construction of an electromagnetic screen enclosing the power source and the work complete with associated input filters. In all cases electromagnetic disturbances must be reduced to the point where they are no longer troublesome.

Note: The welding circuit may or may not be earthed for safety reasons according to national codes. Changing the earthing arrangements should only be authorized by a person who is competent to access whether the changes will increase the risk of injury, e.g., by allowing parallel welding current return paths which may damage the earth circuits of other equipment.

ASSESSMENT OF AREA

Before installing welding equipment the user shall make an assessment of potential electromagnetic problems in the surrounding area. The following shall be taken into account:

a. other supply cables, control cables, signaling and telephone cables; above, below and adjacent to the welding equipment;

b. radio and television transmitters and receivers;

c. computer and other control equipment;

d. safety critical equipment, e.g., guarding of industrial equipment;

e. the health of the people around, e.g., the use of pacemakers and hearing aids;

f. equipment used for calibration or measurement

g. the immunity of other equipment in the environment. The user shall ensure that other equipment being used in the environment is compatible. This may require additional protection measures;

h. the time of day that welding or other activities are to be carried out.

The size of the surrounding area to be considered will depend on the structure of the building and other activities that are taking place. The surrounding area may extend beyond the boundaries of the premises.

METHODS OF REDUCING EMISSIONS

Mains Supply

Welding equipment should be connected to the mains supply according to the manufacturer's recommendations. If interference occurs, it may be necessary to take additional precautions such as filtering of the mains supply. Consideration should be given to shielding the supply cable of permanently installed welding equipment, in metallic conduit or equivalent. Shielding should be electrically continuous throughout its length. The shielding should be connected to the welding power source so that good electrical contact is maintained between the conduit and the welding power source enclosure.

Maintenance of the Welding Equipment

The welding equipment should be routinely maintained according to the manufacturer's recommendations. All access and service doors and covers should be closed and properly fastened when the welding equipment is in operation. The welding equipment should not be modified in any way except for those changes and adjustments covered in the manufacturers instructions. In particular, the spark gaps of arc striking and stabilizing devices should be adjusted and maintained according to the manufacturer's recommendations.

Welding Cables

The welding cables should be kept as short as possible and should be positioned close together, running at or close to floor level.

Equipotential Bonding

Bonding of all metallic components in the welding installation and adjacent to it should be considered. However, metallic components bonded to the work piece will increase the risk that the operator could receive a shock by touching these metallic components and the electrode at the same time. The operator should be insulated from all such bonded metallic components.

Earthing of the Workpiece

Where the workpiece is not bonded to earth for electrical safety, not connected to earth because of its size and position, e.g., ships hull or building steelwork, a connection bonding the workpiece to earth may reduce emissions in some, but not all instances. Care should be taken to prevent the earthing of the work piece increasing the risk of injury to users, or damage to other electrical equipment. Where necessary, the connection of the workpiece to earth should be made by a direct connection to the work piece, but in some countries where direct connection is not permitted, the bonding should be achieved by suitable capacitance, selected according to national regulations.

Screening and Shielding

Selective screening and shielding of other cables and equipment in the surrounding area may alleviate problems of interference. Screening of the entire welding installation may be considered for special applications.

[1] Portions of the preceding text are contained in EN 60974-10: "Electromagnetic Compatibility (EMC) product standard for arc welding equipment."

As a rule of thumb, for many mild steel electrode, if the air is visibly clear and you are comfortable, then the ventilation is generally adequate for your work. The most accurate way to determine if the worker exposure does not exceed the applicable exposure limit for compounds in the fumes and gases is to have an industrial hygienist take and analyze a sample of the air you are breathing. This is particularly important if you are welding with stainless, hardfacing or Special Ventilation products. All Lincoln MSDS have a maximum fume guideline number. If exposure to total fume is kept below that number, exposure to all fume from the electrode (not coatings or plating on the work) will be below the TLV.

There are steps that you can take to identify hazardous substances in your welding environment. Read the product label and material safety data sheet for the electrode posted in the work place or in the electrode or flux container to see what fumes can be reasonably expected from use of the product and to determine if special ventilation is needed. Secondly, know what the base metal is and determine if there is any paint, plating, or coating that could expose you to toxic fumes and/or gases. Remove it from the metal being welded, if possible. If you start to feel uncomfortable, dizzy or nauseous, there is a possibility that you are being overexposed to fumes and gases, or suffering from oxygen deficiency. Stop welding and get some fresh air immediately. Notify your supervisor and co-workers so the situation can be corrected and other workers can avoid the hazard. Be sure you are following these safe practices, the consumable labeling and MSDS to improve the ventilation in your area. Do not continue welding until the situation has been corrected.

NOTE: The MSDS for all Lincoln consumables is available on Lincoln's web-site: www.lincolnelectric.com

Before we turn to the methods available to control welding fume exposure, you should understand a few basic terms:

Natural Ventilation is the movement of air through the workplace caused by natural forces. Outside, this is usually the wind. Inside, this may be the flow of air through open windows and doors.

Mechanical Ventilation is the movement of air through the workplace caused by an electrical device such as a portable fan or permanently mounted fan in the ceiling or wall.

Source Extraction (Local Exhaust) is a mechanical device used to capture welding fume at or near the arc and filter contaminants out of the air.

The ventilation or exhaust needed for your application depends upon many factors such as:

- Workspace volume
- Workspace configuration
- Number of welders
- Welding process and current
- Consumables used (mild steel, hardfacing, stainless, etc.)
- Allowable levels (TLV, PEL, etc.)
- Material welded (including paint or plating)
- Natural airflow

Your work area has adequate ventilation when there is enough ventilation and/or exhaust to control worker exposure to hazardous materials in the welding fumes and gases so the applicable limits for those materials is not exceeded. See chart of TLV and PEL for Typical Electrode Ingredients, the OSHA PEL (Permissible Exposure Limit), and the recommended guideline, the ACGIH TLV (Threshold Limit Value), for many compounds found in welding fume.

Ventilation

There are many methods which can be selected by the user to provide adequate ventilation for the specific application. The following section provides general information which may be helpful in evaluating what type of ventilation equipment may be suitable for your application. When ventilation equipment is installed, you should confirm worker exposure is controlled within applicable OSHA PEL and/or ACGIH TLV. According to OSHA regulations, when welding and cutting (mild steels), natural ventilation is usually considered sufficient to meet requirements, provided that:

1. The room or welding area contains at least 10,000 cubic feet (about 22' x 22' x 22') for each welder.
2. The ceiling height is not less than 16 feet.
3. Cross ventilation is not blocked by partitions, equipment, or other structural barriers.
4. Welding is not done in a conned space.

Spaces that do not meet these requirements should be equipped with mechanical ventilating equipment that exhausts at least 2000 CFM of air for each welder, except where local exhaust hoods or booths, or air-line respirators are used.

Important Safety Note:

When welding with electrodes which require special ventilation such as stainless or hardfacing (see instructions on container or MSDS) or on lead or cadmium plated steel and other metals or coatings which produce hazardous fumes, keep exposure as low as possible and below exposure limit values (PEL and TLV) for materials in the fume using local exhaust or mechanical ventilation. In conned spaces or in some circumstances, for example outdoors, a respirator may be required if exposure cannot be controlled to the PEL or TLV. (See MSDS and chart of TLV and PEL for Typical Electrode Ingredients.) Additional precautions are also required when welding on galvanized steel.

BIBLIOGRAPHY AND SUGGESTED READING

ANSI Z87.1, Practice for Occupational and Educational Eye and Face Protection, American National Standards Institute, 11 West 42nd Street, New York, NY 10036.

Arc Welding and Your Health: A Handbook of Health Information for Welding. Published by The American Industrial Hygiene Association, 2700 Prosperity Avenue, Suite 250, Fairfax, VA 22031-4319.

NFPA Standard 51B, Cutting and Welding Processes, National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9146, Quincy, MA 02269-9959.

OSHA General Industry Standard 29 CFR 1910 Subpart Q. OSHA Hazard Communication Standard 29 CFR 1910.1200. Available from the Occupational Safety and Health Administration at http://www.osha.org or contact your local OSHA office.

The following publications are published by The American Welding Society, P.O. Box 351040, Miami, Florida 33135. AWS publications may be purchased from the American Welding society at http://www.aws.org or by contacting the AWS at 800-443-9353.

ANSI, Standard Z49.1, Safety in Welding, Cutting and Allied Processes. Z49.1 is now available for download at no charge at http://www.lincolnelectric.com/community/safety/ or at the AWS website http://www.aws.org.

AWS F1.1, Method for Sampling Airborne Particulates Generated by Welding and Allied Processes.

AWS F1.2, Laboratory Method for Measuring Fume Generation Rates and Total Fume Emission of Welding and Allied Processes.

AWS F1.3, Evaluating Contaminants in the Welding Environment: A Strategic Sampling Guide.

AWS F1.5, Methods for Sampling and Analyzing Gases from Welding and Allied Processes.

AWS F3.2, Ventilation Guide for Welding Fume Control.

AWS F4.1, Recommended Safe Practices for the Preparation for Welding and Cutting of Containers and Piping That Have Held Hazardous Substances.

AWS SHF, Safety and Health Facts Sheets. Available free of charge from the AWS website at http://www.aws.org.

LISTED BELOW ARE SOME TYPICAL INGREDIENTS IN WELDING ELECTRODES AND THEIR TLV (ACGIH) GUIDELINES AND PEL (OSHA) EXPOSURE LIMITS

INGREDIENTS	CAS No.	TLV mg/m3	PEL mg/m3
Aluminum and/or aluminum alloys (as Al)*****	7429-90-5	10	15
Aluminum oxide and/or Bauxite*****	1344-28-1	10	5**
Barium compounds (as Ba)*****	513-77-9	****	****
Chromium and chromium alloys or compounds (as Cr)*****	7440-47-3	0.5(b)	.005(b)
Fluorides (as F)	7789-75-5	2.5	2.5
Iron	7439-89-6	10*	10*
Limestone and/or calcium carbonate	1317-65-3	10	15
Lithium compounds (as Li)	554-13-2	10*	10*
Magnesite	1309-48-4	10	15
Magnesium and/or magnesium alloys and compounds (as Mg)	7439-95-4	10*	10*
Manganese and/or manganese alloys and compounds (as Mn)*****	7439-96-5	0.2	5.0(c)
Mineral silicates	1332-58-7	5**	5**
Molybdenum alloys (as Mo)	7439-98-7	10	10
Nickel*****	7440-02-0	1.5	1
Silicates and other binders	1344-09-8	10*	10*
Silicon and/or silicon alloys and compounds (as Si)	7440-21-3	10*	10*
Strontium compounds (as Sr)	1633-05-2	10*	10*
Zirconium alloys and compounds (as Zr)	12004-83-0	5	5

Supplemental Information:

(*) Not listed. Nuisance value maximum is 10 milligrams per cubic meter. PEL value for iron oxide is 10 milligrams per cubic meter. TLV value for iron oxide is 5 milligrams per cubic meter.

(**) As respirable dust.

(*****) Subject to the reporting requirements of Sections 311, 312, and 313 of the Emergency Planning and Community Right-to-Know Act of 1986 and of 40CFR 370 and 372.

(b) The PEL for chromium (VI) is .005 milligrams per cubic meter as an 8 hour time weighted average. The TLV for water-soluble chromium (VI) is 0.05 milligrams per cubic meter. The TLV for insoluble chromium (VI) is 0.01 milligrams per cubic meter.

c) Values are for manganese fume. STEL (Short Term Exposure Limit) is 3.0 milligrams per cubic meter. OSHA PEL is a ceiling value.

(****) There is no listed value for insoluble barium compounds. The TLV for soluble barium compounds is 0.5 mg/m3.

TLV and PEL values are as of April 2006. Always check Material Safety Data Sheet (MSDS) with product or on the Lincoln Electric website at http://www.lincolnelectric.com

MASTER TABLE OF CONTENTS FOR ALL SECTIONS

TABLE OF CONTENTS
- THEORY OF OPERATION SECTION -

Figure E.1 - Block logic diagram

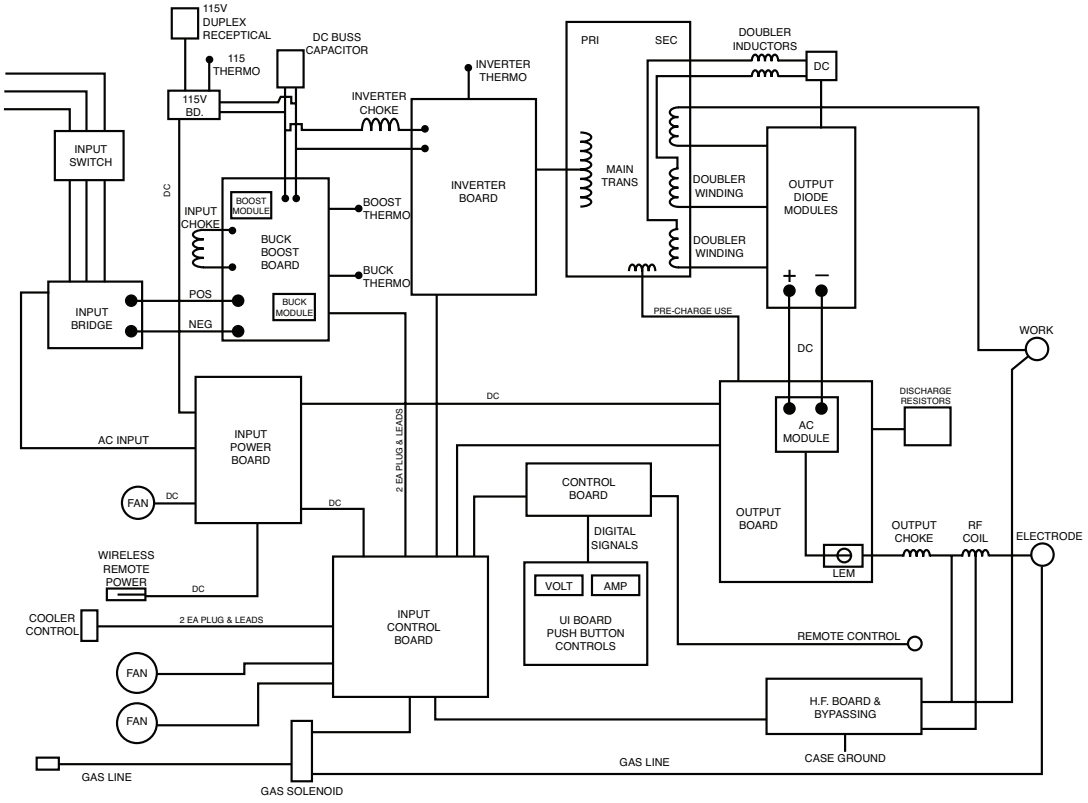
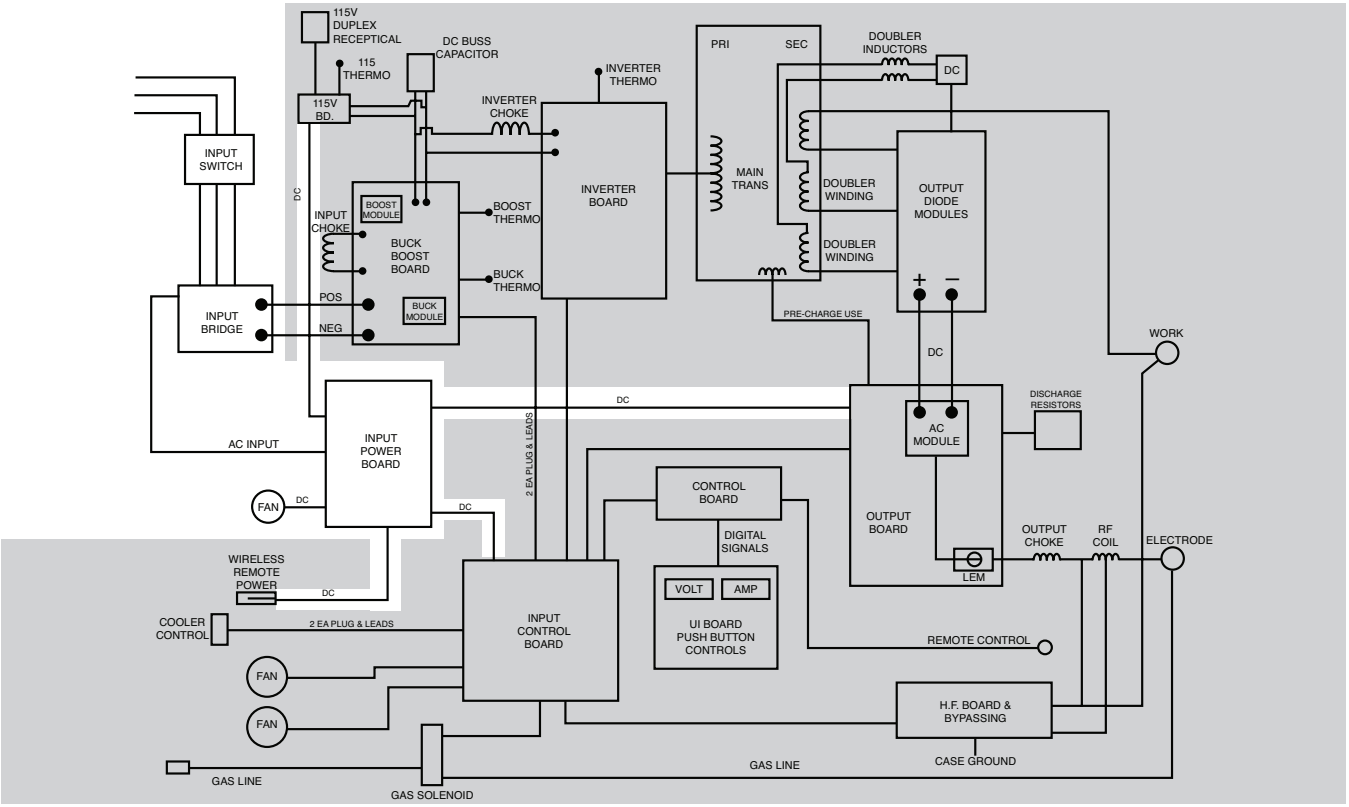


Figure E.2 - Input power board



INPUT POWER BOARD

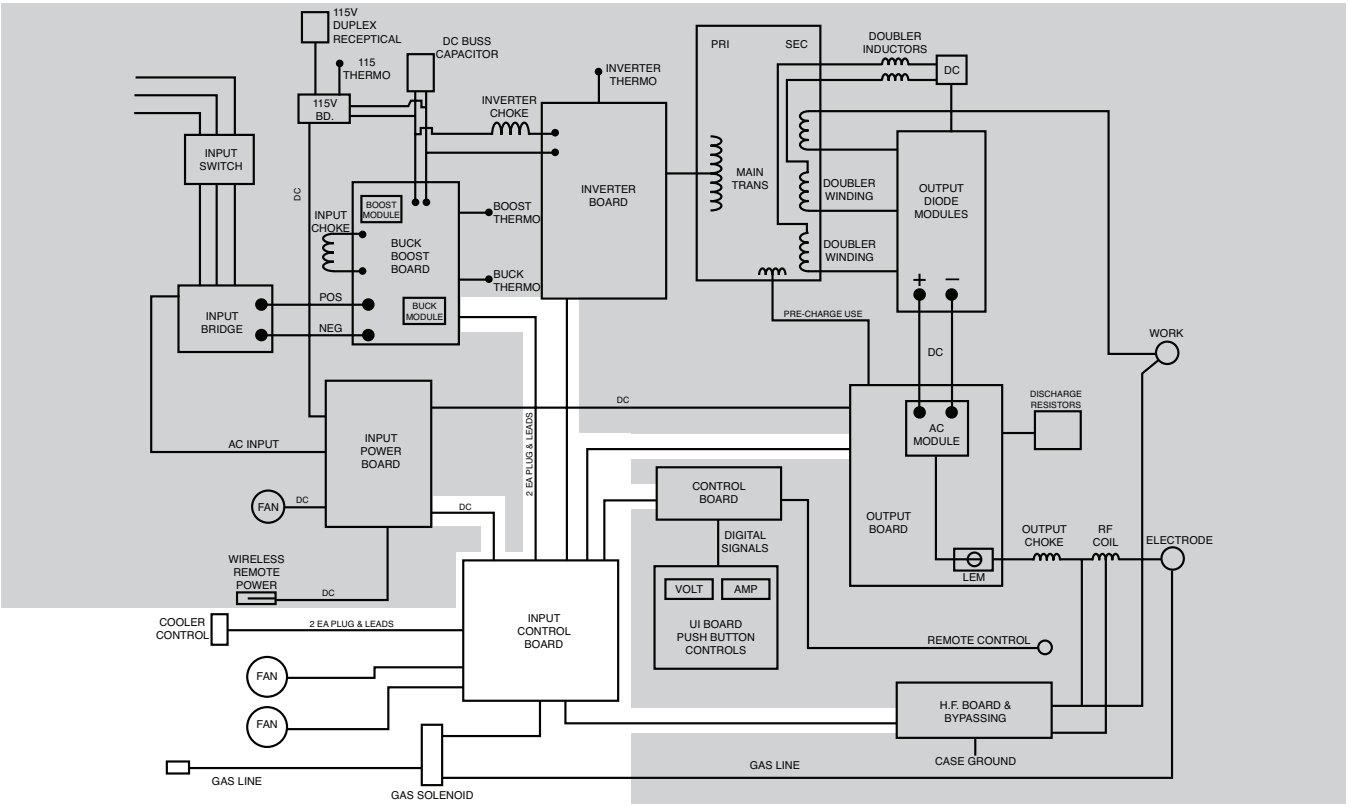
The AC input (3 phase or single phase) is applied to the Aspect 375 thru an on/off switch. The AC input power is applied to a 3 phase input rectifier bridge. The DC output of the input rectifier bridge is then applied to the Buck/Boost board. The AC input power is also applied to the input power PC board. The input power board develops several DC supplies for use with other components in the welder. We use switching type DC to DC converter supplies and standard type voltage regulator supplies to accomplish this. The components that receive DC power from the input power board are the following:

- Fan
- Input control board
- Output Board
- 115V Auxiliary PC Board
- Wireless Remote

The input power board has its own pre-charge circuit to gradually activate the internal components. There is an internal PTC thermistor that can shut down this board if over heating or over current of power supply conditions occur.

NOTE: Unshaded areas of Block Logic Diagram are the subject of discussion.

Figure E.3 - Input control board



INPUT CONTROL BOARD

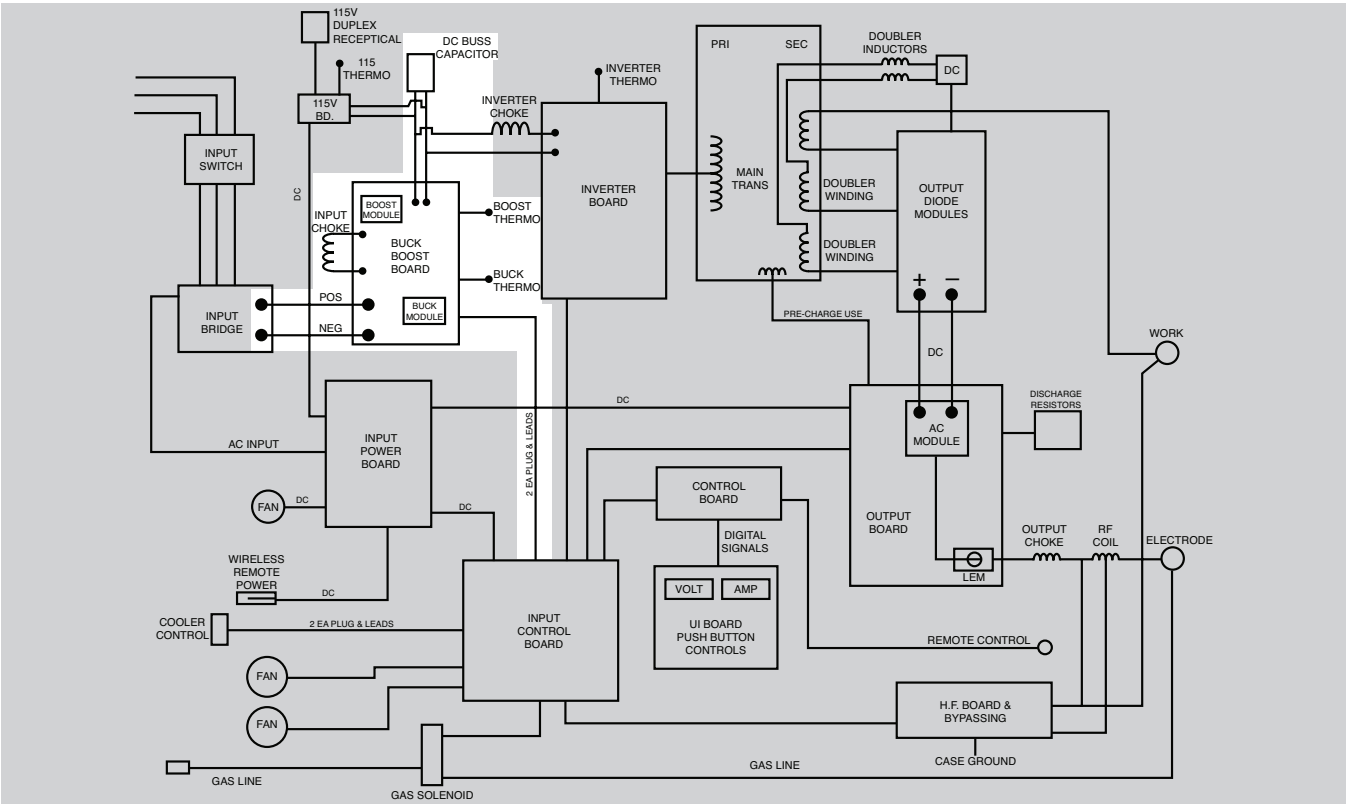
The input control board receives its power from the input power board. The input control board controls the following components:

- Main Cooling Fans Drive Circuits
- Gas Solenoid Drive
- HF (High Frequency Board) Drive Command
- Water Cooler Control
- Pre-Charge Relay Isolation/Drive

The input control board also monitors output voltage, current feedback and user commands received from the output and control board. It then regulates the primary side for the buck/boost board and inverter board. Four LED's are housed on the input control board. Two of the LED's indicate the buck/boost circuit is operating. Another LED indicates if the DC capacitors are over or under voltaged. The fourth LED indicates if three phase or single phase voltage is being applied to the machine. The Aspect 375 automatically limits the output to 275 amps when in single phase operation.

NOTE: Unshaded areas of Block Logic Diagram are the subject of discussion.

Figure E.4 - Buck/boost board



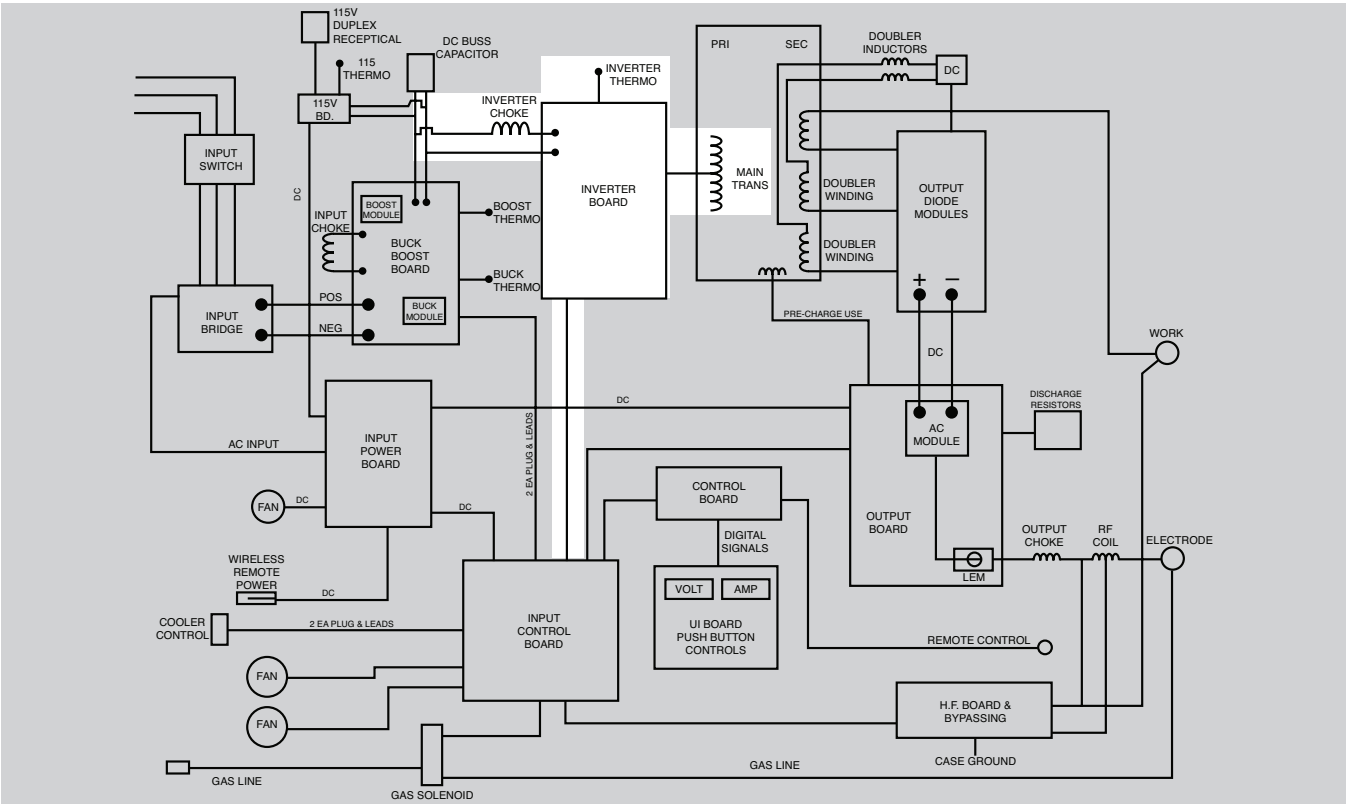
BUCK/BOOST BOARD

The buck/boost board receives rectified input voltage from the input rectifier bridge. The main purpose of this board is to produce a constant 400 VDC regardless of input voltage. The buck boost circuit consists of a buck converter followed by a boost converter. The boost switch is active when the input voltage is at 230 VAC input or less. Under this condition the Buck switch is held ON the entire time. The buck switch is active when the input voltage is at 325 VAC or more. Under this condition the boost switch is not active for most of the time. The buck/boost circuit operates at 20-22 kHz.

During initial power up of the welder, a pre-charge resistor and relay located on this board is used to slowly charge the DC bus capacitor. The buck/boost board monitors the temperature of the IGBT's. Thermistors (PTC) type (Positive Temperature Coefficient devices) monitor temperatures and fan speed control. There are no LED's available on this board.

NOTE: Unshaded areas of Block Logic Diagram are the subject of discussion.

Figure E.5 - Inverter board

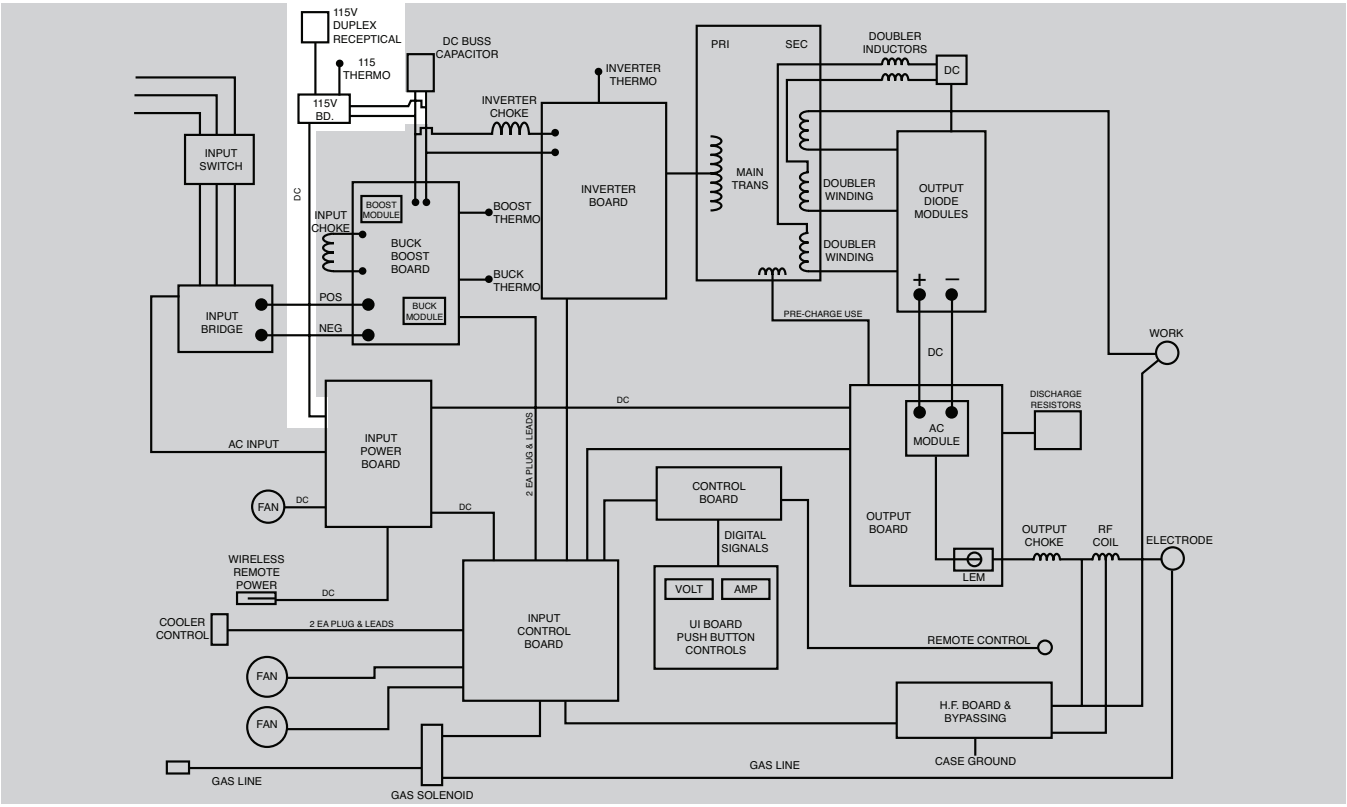


INVERTER BOARD

The inverter board receives 400 VDC power that was generated by the buck/boost board and stored by the DC buss capacitor. The inverter choke helps maintain a stable voltage during loading conditions on the welder's output. The inverter board output is connected to the primary of the main transformer (ceramic ferrite core type). The inverter board H bridge (IGBT's) are configured to produce an alternating pulsed DC+ and DC- current, at a rate of 35 Khz, into the primary of the main transformer. Minimum and maximum output control is achieved from this area of the welder via commands from the input control board, that utilizes feedback information received from other boards. There is one Green LED which represents a +15 VDC supply received from the input control board.

NOTE: Unshaded areas of Block Logic Diagram are the subject of discussion.

Figure E.6 - 115V auxiliary board

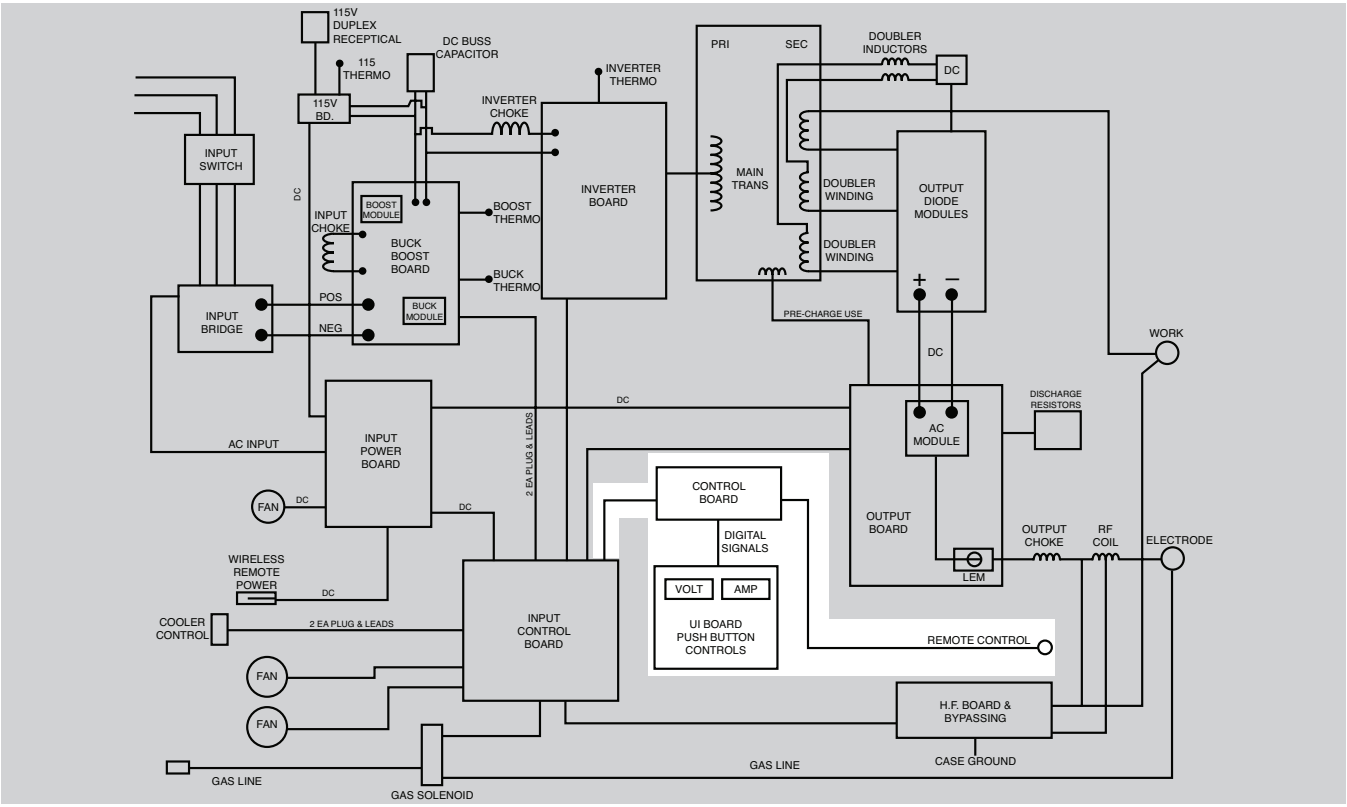


115V AUXILIARY BOARD

The auxiliary power board develops a constant 115 VAC for an external 115 VAC duplex receptacle protected by a 10 amp circuit breaker. This board requires an input of 400 VDC from the DC link capacitor. A thermostat (normally closed) will shut down the board in the event of an overheating condition. The electronics on this board are high speed switching devices and circuits. To aid in trouble-shooting, there are three green and one red LED's on this board.

NOTE: Unshaded areas of Block Logic Diagram are the subject of discussion.

Figure E.7 - User interface board & control board



USER INTERFACE BOARD & CONTROL BOARD

The operator selects the desired weld modes and processes via the user interface board. The preset, actual voltages and amperages are displayed on the user interface board. Nine memory modes can also be selected via the user interface board. The output control knob (encoder type) is used to adjust output and other parameters. The user interface board communicates these user commands to the control board. Error codes and thermal overloads are also displayed on this board.

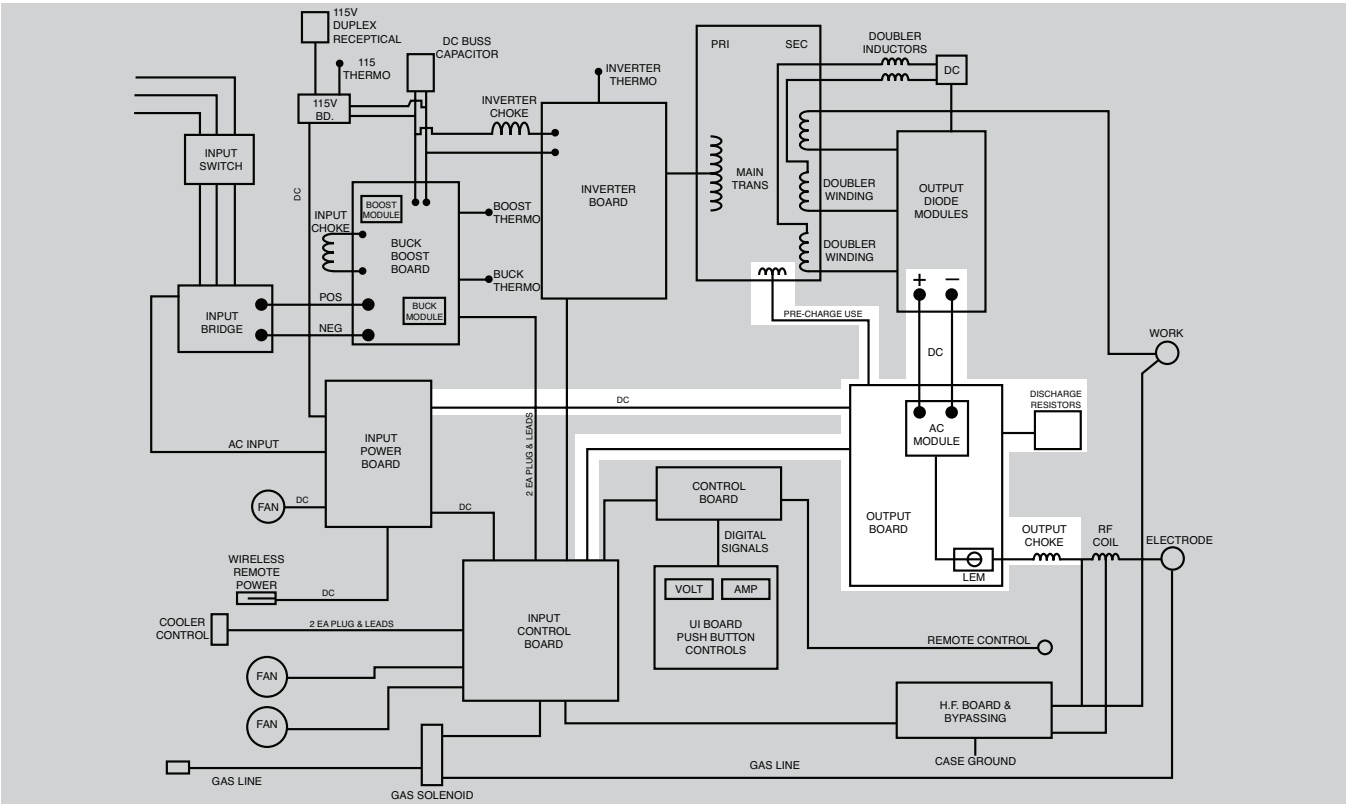
The commands the control board receives from either the user interface board or the remote receptacle are processed and the appropriate signals are then forwarded to the input control board. Some of the signals sent to the input control board are the following:

- Output polarity
- Fan enable
- High frequency enable
- Solenoid enable
- Background enable
- Thermal errors
- Fan speed control
- Output current
- Peak current

To aid in troubleshooting, there are three Green LED's on the control board.

NOTE: Unshaded areas of Block Logic Diagram are the subject of discussion.

Figure E.8 - Output board



OUTPUT BOARD

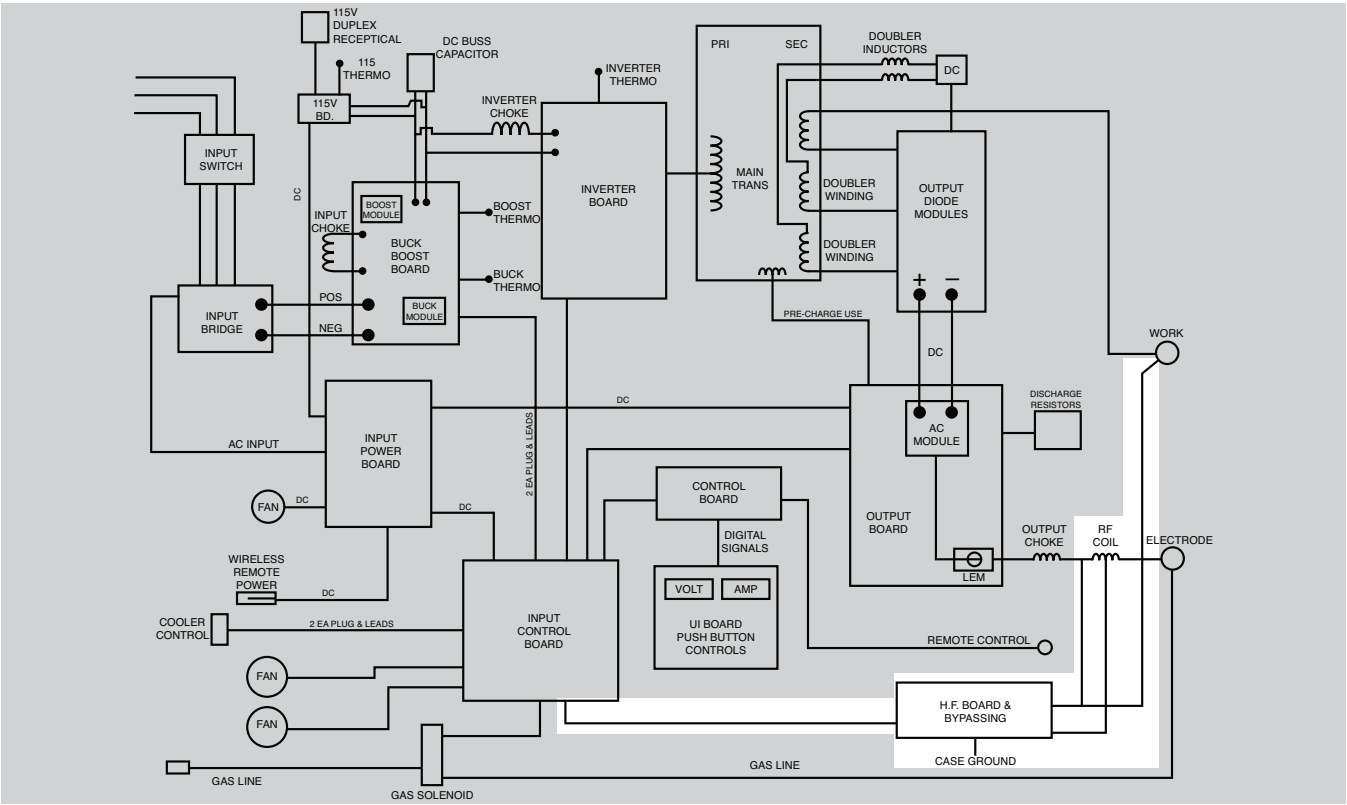
The AC/DC module (IGBT type) is located on the output board. The output board controls the drive circuits to activate the IGBTs when required for DC or AC welding output. The pre-charge circuit winding, located on the main transformer, is needed to switch ON the AC/DC module. The current monitoring device (LEM) is located on the output board. The feedback information from the LEM is applied to the input control board. The output voltage feedback is also supplied to the input control board from the output board. A background choke (not on board) is necessary to boost the background level during low end TIG welding. There are 9 LEDs on the board.

Table E.1 - Output board LEDs

LED #	COLOR	FUNCTION
1	RED	GATE DRIVE AC + SWITCH PRESENT
2	RED	GATE DRIVE AC - SWITCH PRESENT
3	RED	GATE DRIVE BACKGROUND + SWITCH PRESENT
4	RED	GATE DRIVE BACKGROUND - SWITCH PRESENT
5	RED	BACKGROUND + 15 VOLT SUPPLY WORKING
6	GREEN	POWER SUPPLY AC + SWITCH WORKING
7	GREEN	POWER SUPPLY AC - SWITCH WORKING
8	GREEN	POWER SUPPLY BACKGROUND + SWITCH WORKING
9	GREEN	POWER SUPPLY BACKGROUND - SWITCH WORKING

NOTE: Unshaded areas of Block Logic Diagram are the subject of discussion.

Figure E.9 - High frequency board & bypassing

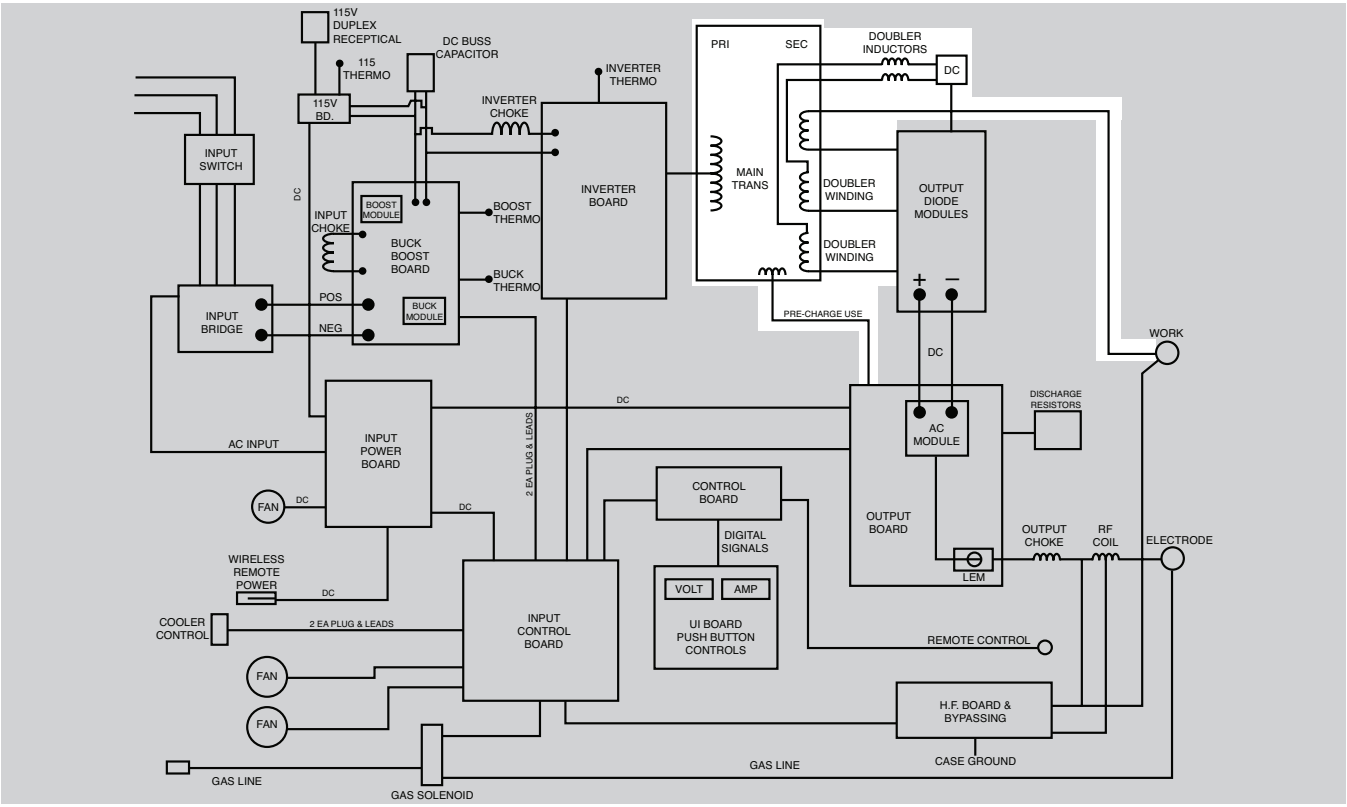


HIGH FREQUENCY BOARD & BYPASSING

The capacitive discharge type high frequency board is used to ignite the arc during the TIG welding process. These high frequency spikes (1000 VDC) are transferred to the electrode output terminal using a high frequency transformer. The high frequency board receives its command signal (HF enable) from the input control board. High frequency bypass protection circuits are also housed on this PC board. The bypass devices protect the output board and other circuit components from the high frequency voltage spikes generated on the high frequency board. To aid in troubleshooting there are two LED's (one Red and one Green). The Red LED indicates that the high frequency board should be generating a high frequency output spike. The Green LED indicates that the output enable signal is being received from the input control board.

NOTE: Unshaded areas of Block Logic Diagram are the subject of discussion.

Figure E.10 - Main transformer

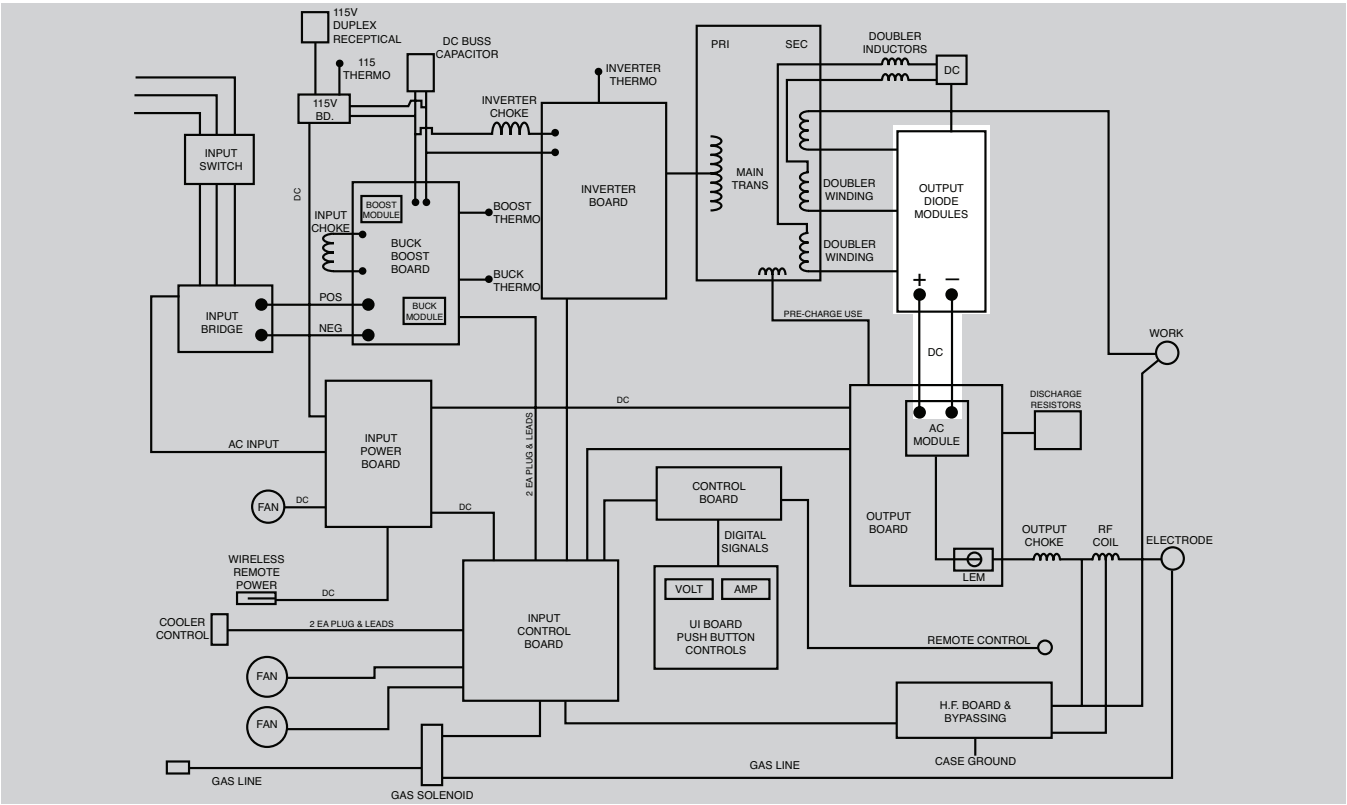


MAIN TRANSFORMER

The primary winding of the main transformer receives a high voltage, high frequency (35 KHz) input from the inverter board. There are several secondary windings incorporated in the main transformer. One of these windings is the high current secondary which is used for welding output. The doubler windings and associated circuitry (chokes and diode bridge) are required for improved cellulose 5P whip stick welding. This circuit also aids in the re-ignition of the arc during AC TIG welding. An additional winding pre-charges the AC switch circuitry on the output board to ensure reliable switching of the module.

NOTE: Unshaded areas of Block Logic Diagram are the subject of discussion.

Figure E.11 - Output diode modules

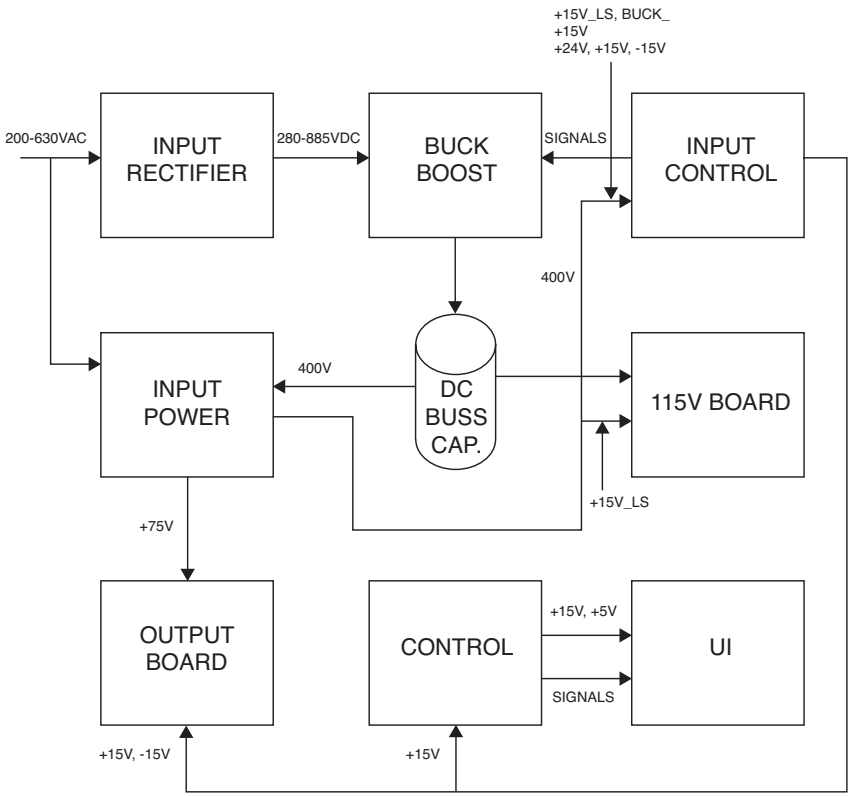


OUTPUT DIODE MODULES

The eight dual module diodes are used to convert the AC from the high current secondary winding of the main transformer to a DC output. The DC output of the doubler circuitry is also applied to the diode modules. See ***Main Transformer*** for doubler circuit explanation. The eight diode modules supply DC power to the output board for welding output.

NOTE: Unshaded areas of Block Logic Diagram are the subject of discussion.

Figure E.12 - Start up block diagram



ASPECT 375 SPECIFIC DATA

- Inverter runs at 35 KHz.
- Machine starts with DC(+) in AC polarity for both Tig & Stick, therefore to measure OCV in AC, meter must be set to measure DC voltage.
- In Stick mode OCV is regulated at 60 VDC, in Tig mode OCV is around 105 VDC and not regulated.
- In Tig mode OCV turns off after 3 seconds if not welding.
- Hi-freq is only for starting even in AC Tig.
- AC Waveshape & frequency settings only work in Tig, in Stick the Waveshape is sine wave at 60Hz.
- There is a small fan, invisible if wraparound on, to cool Input Power board & 115V board.
- Two main fans don't turn off at idle, only run at a reduced speed.
- Machine only checks for water cooler presence at power up; if a cooler is connected machine turns cooler on for 30 seconds before checking water flow (Auto-Prime feature).
- Water cooler, by default, runs all the time. Can be set to turn on/off with welding by select "AUTO" in Tig menu. See front section of this manual for details.
- For long idle states , the welder will display on the UI board (front panel) "GRN MODE" indicating "green mode" low power usage is in effect.

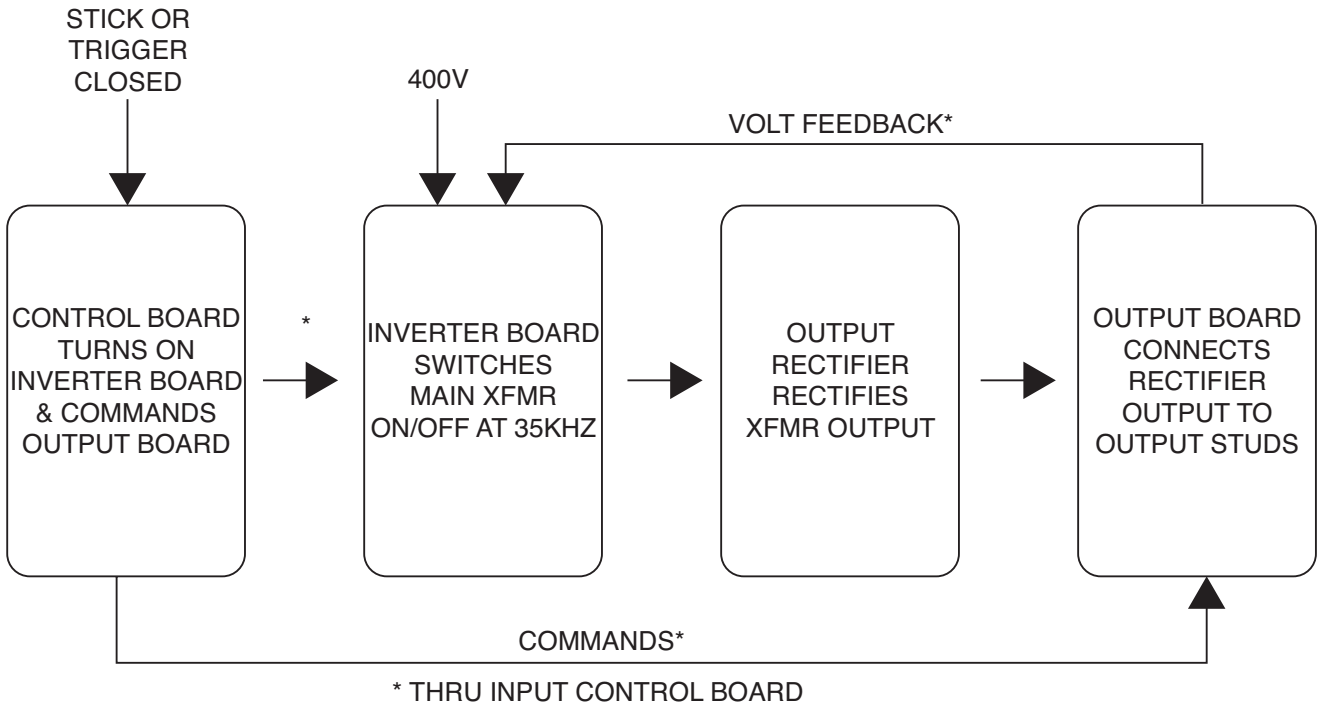
MACHINE START UP

There are four main actions when machine is turned on:

1. **Receiving the rectified voltage, the Input Power board generates power supplies for all boards except the 5V to power Volt & Amp displays; this 5V is generated by the Control board from the 15V generated by the Input Power board**. Green input LED blinking at this time on UI board.
2. **Input Control board produces Buck/Boost signals for Buck/Boost board to regulate 400 VDC on DC Bus capacitor** – Green input LED turns solid after 10 seconds on the user interface board.
3. **Input Power board receives 400 VDC and produce 75 VDC for Output board** – 1 red LED & 3 green LEDs on Output board turns on after 3 seconds.
4. **115V Auxiliary board receives 400 VDC and produce 115 VAC** – the 2nd green LED on Auxiliary board turns on & 115V available after 14 seconds.

NOTE: Unshaded areas of Block Logic Diagram are the subject of discussion.

Figure E.13 - OCV operation



OCV VALUES

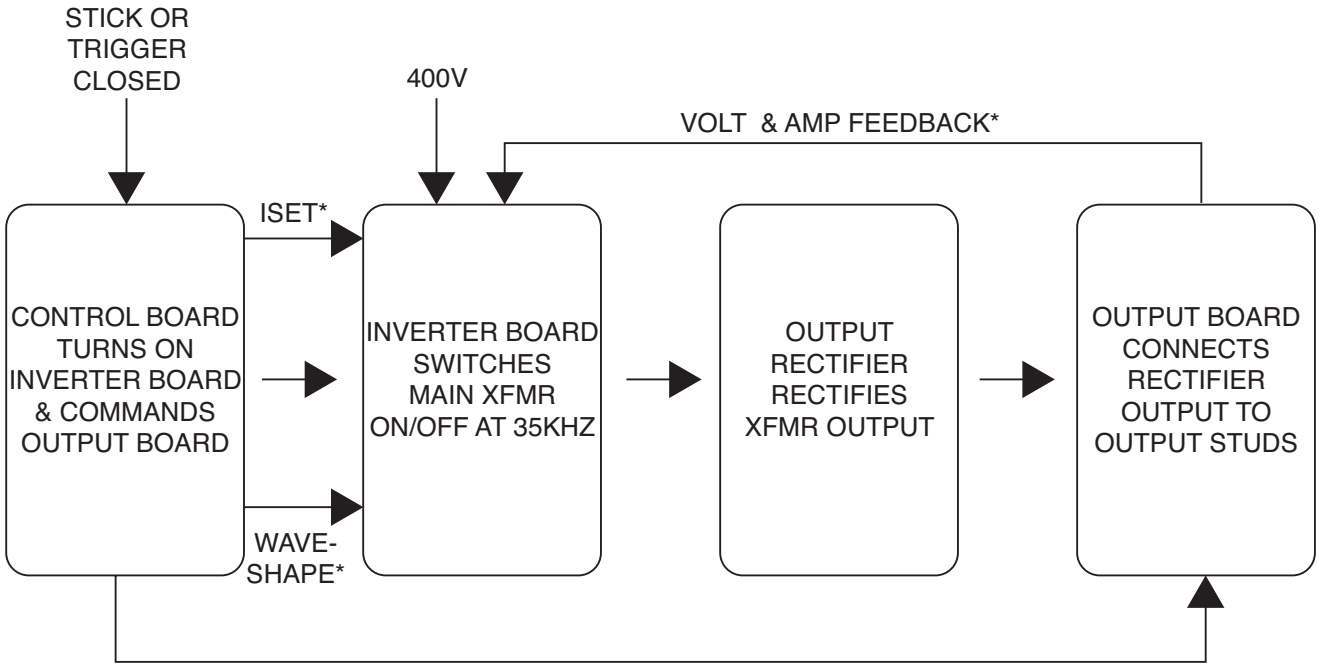
MEASURE WITH (+) PROBE TO ELECTRODE & (-) PROBE TO WORK.

CAUTION: Do not connect meter to output studs to measure OCV in HF Tig mode unless hi-freq has been disabled.

- **STICK, AC & DC = +60 VDC** (Machine does not display OCV).
- **HF TIG AC = +105 VDC**, turns off after three seconds if not welding (Machine displays 100V).
- **HF TIG DC = -105 VDC**, turns off after three seconds if not welding (Machine displays 100V).
- **LIFT TIG, AC & DC = +6.5 VDC** (Machine does not display OCV).

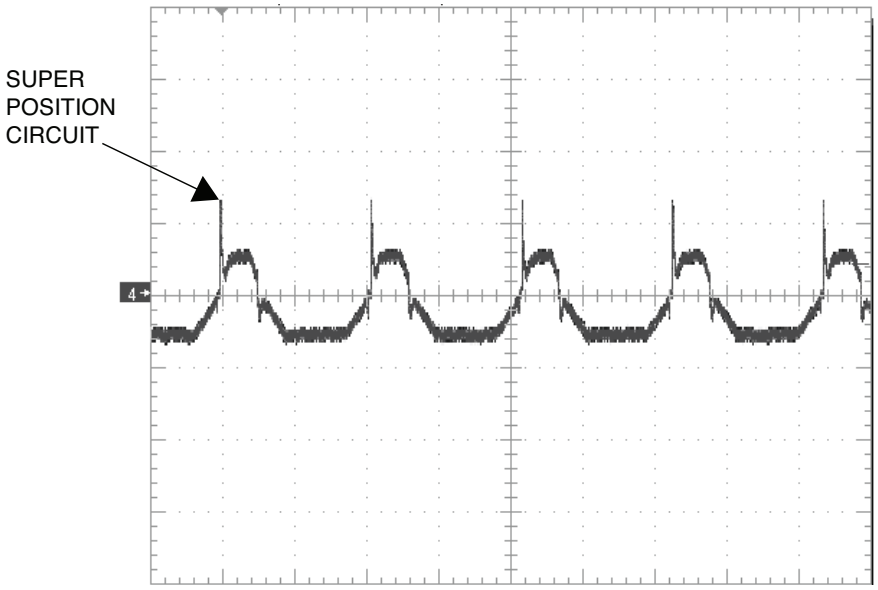
NOTE: Unshaded areas of Block Logic Diagram are the subject of discussion.

Figure E.14 - Load Operation



NOTE: Unshaded areas of Block Logic Diagram are the subject of discussion.

Figure E.15 - Super position circuit



SUPER POSITION CIRCUIT

FUNCTION

Hi-freq is only for starting in AC, what is needed is the Super Position Circuit to re-light the arc at zero-crossings.

SYMPTOMS

WELD O.K. IN STICK AND DC TIG BUT NOT IN AC TIG:

- Arc rectification
- Arc randomly goes out

Definition of ARC RECTIFICATION = During the AC tig weld process the positive cycle is not developed or eliminated (typically on the positive cycle). Causing only the negative cycle to be involved in a normally AC process.

ACTIVE SNUBBER CIRCUIT

FUNCTION

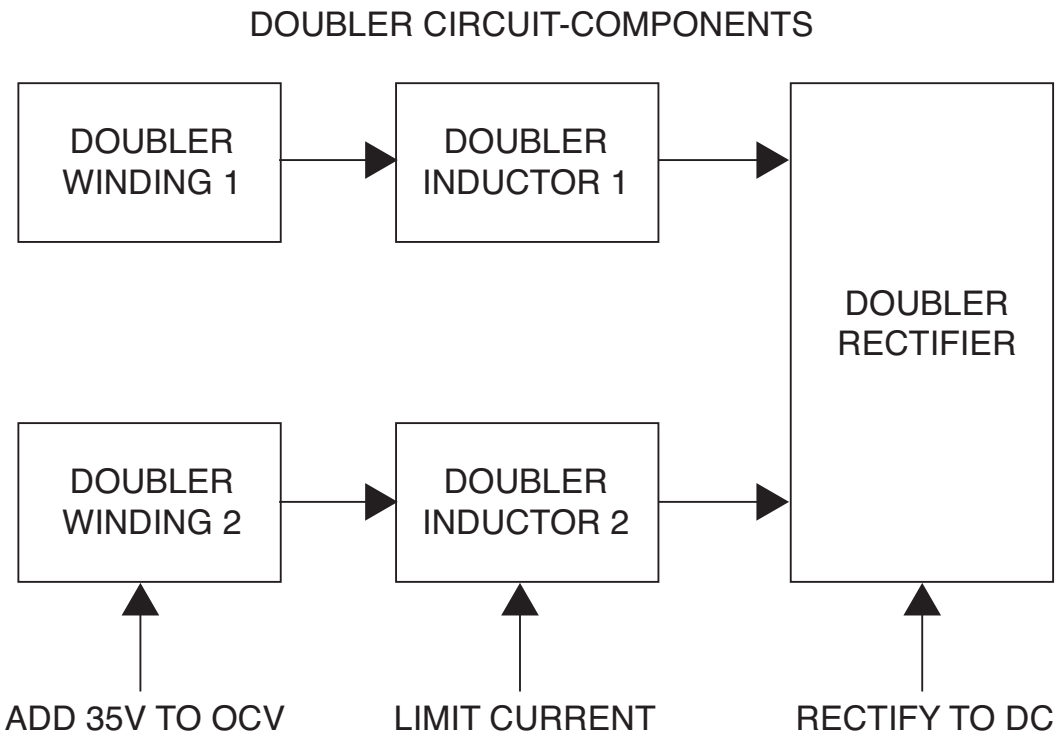
To snub transient voltage to protect power components on Output board.

RELATIONSHIP TO SUPER POSITION CIRCUIT

Super Position capacitor voltage can't go above this Snubber voltage 400 – 425V typ.

NOTE: Unshaded areas of Block Logic Diagram are the subject of discussion.

Figure E.16 - Doubler circuit components



THIS IS A BASIC DESCRIPTION OF WHAT IS ACTUALLY IN THE WELDER.

DOUBLER CIRCUIT

FUNCTION

To boost voltage up to maintain the arc in Stick (whipping) and in AC Tig (at zero-crossing transitions).

NOTE: Unshaded areas of Block Logic Diagram are the subject of discussion.

TABLE OF CONTENTS
- TROUBLESHOOTING AND REPAIR SECTION -

TABLE OF CONTENTS
- TROUBLESHOOTING AND REPAIR SECTION -

HOW TO USE TROUBLESHOOTING GUIDE

⚠ WARNING

Service and repair should be performed by only Lincoln Electric Factory Trained Personnel. Unauthorized repairs performed on this equipment may result in danger to the technician and machine operator and will invalidate your factory warranty. For your safety and to avoid Electrical Shock, please observe all safety notes and precautions detailed throughout this manual.

This Troubleshooting Guide is provided to help you locate and repair possible machine malfunctions. Simply follow the three-step procedure listed below.

Step 1. LOCATE PROBLEM (SYMPTOM). Look under the column labeled "PROBLEM" (SYMPTOMS). This column describes possible symptoms that the machine may exhibit. Find the listing that best describes the symptom that the machine is exhibiting. Symptoms are grouped into eleven main categories: Start Up Problems, Preset Problems, Output Problems, Open Circuit Voltage (OCV) Problems, Remote Control Problems, Gas Problems, High Frequency Problems, 115VAC Auxiliary Problems, Water Cooler Problems, TIG Welding Problems and Stick Welding Problems.

Step 2. PERFORM EXTERNAL TESTS. The second column, labeled "POSSIBLE AREAS OF MISADJUSTMENT(S)", lists the obvious external possibilities that may contribute to the machine symptom. Perform these tests/checks in the order listed. In general, these tests can be conducted without removing the case cover.

Step 3. PERFORM COMPONENT TESTS. The last column, labeled "Recommended Course of Action" lists the most likely components that may have failed in your machine. It also specifies the appropriate test procedure to verify that the subject component is either good or bad. If there are a number of possible components, check the components in the order listed to eliminate one possibility at a time until you locate the cause of your problem.

All of the referenced test procedures referred to in the Troubleshooting Guide are described in detail at the end of this section. Refer to the Troubleshooting and Repair Table of Contents to locate each specific Test Procedure. All of the referred to test points, components, terminal strips, etc., can be found on the referenced electrical wiring diagrams and schematics. Refer to the Electrical Diagrams Section Table of Contents to locate the appropriate diagram.

⚠ CAUTION

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

PC BOARD TROUBLESHOOTING PROCEDURES

⚠ WARNING

ELECTRIC SHOCK can kill.

- **Have an electrician install and service this equipment. Turn the input power OFF at the fuse box before working on equipment. Do not touch electrically hot parts.**

⚠ CAUTION

Sometimes machine failures appear to be due to PC board failures. These problems can sometimes be traced to poor electrical connections. To avoid problems when trouble-shooting and replacing PC boards, please use the following procedure:

1. Determine to the best of your technical ability that the PC board is the most likely component causing the failure symptom.
2. Check for loose connections at the PC board to assure that the PC board is properly connected.
3. If the problem persists, replace the suspect PC board using standard practices to avoid static electrical damage and electrical shock. Read the warning inside the static resistant bag and perform the following procedures:

PC board can be damaged by static electricity.

- Remove your body's static charge before opening the static-shielding bag. Wear an anti-static wrist strap. For safety, use a 1 Meg ohm resistive cord connected to a grounded part of the equipment frame.
- If you don't have a wrist strap, touch an un-painted, grounded, part of the equipment frame. Keep touching the frame to prevent static build-up. Be sure not to touch any electrically live parts at the same time.

ATTENTION

Static-Sensitive Devices Handle only at Static-Safe Workstations

Reusable Container Do Not Destroy

- Tools which come in contact with the PC board must be either conductive, anti-static or static-dissipative.
- Remove the PC board from the static-shielding bag and place it directly into the equipment. Don't set the PC board on or near paper, plastic or cloth which could have a static charge. If the PC board can't be installed immediately, put it back in the static-shielding bag.
- If the PC board uses protective shorting jumpers, don't remove them until installation is complete.
- If you return a PC board to The Lincoln Electric Company for credit, it must be in the static-shielding bag. This will prevent further damage and allow proper failure analysis.

4. Test the machine to determine if the failure symptom has been corrected by the replacement PC board.

NOTE: It is desirable to have a spare (known good) PC board available for PC board troubleshooting.

NOTE: Allow the machine to heat up so that all electrical components can reach their operating temperature.

5. Remove the replacement PC board and substitute it with the original PC board to recreate the original problem.
    a. If the original problem does not reappear by substituting the original board, then the PC board was not the problem. Continue to look for bad connections in the control wiring harness, junction blocks and terminal strips.
    b. If the original problem is recreated by the substitution of the original board, then the PC board was the problem. Reinstall the replacement PC board and test the machine.
6. Always indicate that this procedure was followed when warranty reports are to be submitted.

NOTE: Following this procedure and writing on the warranty report, "INSTALLED AND SWITCHED PC BOARDS TO VERIFY PROBLEM," will help avoid denial of legitimate PC board warranty claims.

Observe Safety Guidelines detailed in the beginning of this manual.

TROUBLESHOOTING GUIDE

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
START UP PROBLEMS		
Machine is dead. The meters do not light.	1. Check to make sure the correct input voltage is being applied to the machine. See Wiring Diagram. 2. Check the input fuses and connections.	1. Check the input line switch. 2. Perform the ***Input Rectifier Test***. 3. Perform the ***Input Power Board Test***. 4. Perform the ***Input Control Board Test***. 5. Perform the ***Control Board Test***. 6. Perform the ***User Interface Board Test***.
The Green input indicator light does not stop blinking.	1. Check to make sure the correct input voltage is being applied to the machine. See Wiring Diagram. 2. The output trigger device may have been closed during start up. Turn machine off and make sure trigger devices are open.	1. Perform the ***Input Control Board Test***. 2. Perform the ***Buck/Boost Board & IGBT Test***.
Machine experienced a loud pop and/or smoke came out of the welder.	1. Make sure the correct input voltages are being applied to the machine.	1. Perform the ***Input Rectifier Test***. 2. Perform the ***Buck/Boost Board & IGBT Test***. 3. Perform the ***Input Power Board Test***. 4. Perform the ***Inverter Board Test***, visual and resistance checks only.

⚠ CAUTION

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

Observe Safety Guidelines detailed in the beginning of this manual.

TROUBLESHOOTING GUIDE

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
PRESET PROBLEMS		
The operating amperage changes after changing the polarity from electrode positive (EP) to electrode negative (EN).	1. This is normal, the operating amperage is calculated based on EP, EN and balance settings.	1. Adjust to the desired amperage.
The operating amperage cannot be preset for two amps.	1. The tungsten diameter (DIA) in "GTAW" menu is set for specific size, example 3/32".	1. Set for "INTL" or smaller diameter tungsten.
The operating amperage cannot be set for 375 amps.	1. The starting polarity, electrode positive (EP) and electrode negative (EN) are set too extreme.	1. Set for auto balance or reduce electrode positive (EP) or electrode negative (EN).
Machine looks normal, no error codes, user interface functions correctly. But there is no output.	1. Make sure the machine is being triggered for welding output.	1. Look for loose or broken output conductors within the welder. See Wiring Diagram. 2. The output choke may be open. See Wiring Diagram. 3. Perform the ***Output Diode Module Test***. 4. Perform the ***Output Board Test***.

⚠ CAUTION

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

Observe Safety Guidelines detailed in the beginning of this manual.

TROUBLESHOOTING GUIDE

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
OUTPUT PROBLEMS		
No welding output in TIG mode. No gas and no high frequency. Welder has normal output in stick mode.	1. Check the hand/foot amptrol for proper functionality.	1. N/A.
No output in TIG mode. The gas and the high frequency function normally. Machine has normal output in stick mode.	1. N/A.	1. Perform the ***Control Board Test***.
No output in either Stick or TIG modes.	1. N/A.	1. Perform the ***Buck/Boost Board & IGBT Test***. 2. Perform the ***Inverter Board Test***. 3. Perform the ***Control Board Test***.
The thermal light turns ON. No welding output.	1. Welding application exceeds rated duty cycle. 2. Air intake and exhaust louvers may be blocked. 3. Dirt and dust may have clogged the cooling channel inside the machine.	1. Perform the ***Fan Test***. 2. Perform the ***User Interface Board Test***. 3. Perform the ***Control Board Test***. 4. Perform the ***Buck/Boost Board & IGBT Test***. 5. Perform the ***Inverter Board Test***. 6. Perform the ***Buck & Boost PTC Thermistor Test***. 7. Perform the ***Output Board Test***.
The open circuit voltage (OCV) is below 80 volts in TIG mode.	1. N/A.	1. Perform the ***Voltage Doubler Rectifier Module Test*** and check the connection. 2. Perform the ***Output Board Test*** and check the connection.
The open circuit voltage (OCV) is below 10 volts in TIG mode.	1. The preflow time may be set too long. Set for typical 0.5 sec preflow.	1. Check to make sure the precharge winding is not open (Plug J03 on the output board, leads X9 and X10). See Wiring Diagram. 2. Perform the ***Voltage Doubler Rectifier Module Test***. 3. Perform the ***Current Transducer Test***. 4. Perform the ***Discharge Resistor Module Test***. **OCV NOTE:** Do not connect a meter to machine output terminals to measure voltage in TIG mode, hi-frequency produced by machine may damage meter.

⚠ CAUTION

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

Observe Safety Guidelines detailed in the beginning of this manual.

TROUBLESHOOTING GUIDE

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
OPEN CIRCUIT VOLTAGE (OCV) PROBLEMS		
NOTE: Do not connect a meter to machine output terminals to measure voltage in Tig mode, hi-freq produced by machine may damage meter. When trigger is closed in Tig mode, machine displays OCV on left meter for approximately 3 seconds then output will turn off if a weld is not made. Machine does not display OCV in stick mode even though the output is on constantly in stick mode.		
OCV is below 10V in Tig mode.	1. Preflow time set too low. 2. Faulty output board or connection. 3. Faulty control board or connection.	1. Set for typical 0.5 second preflow. 2. Check output board and connection. 3. Check control board and connection. 4. Check the Pre-Charge winding is not open (J03 plug on output board). 5. Perform the ***Voltage Doubler Rectifier Module Test***. 6. Perform the ***Current Transducer Test***. 7. Perform the ***Discharge Resistor Module Test***.
OCV is below 80V in Tig mode.	1. Faulty volt doubler rectifier or connection. 2. Faulty doubler inductor or connection. 3. Faulty output board or connection.	1. Perform the ***Voltage Doubler Rectifier Module Test*** and check the connection. 2. Perform the ***Output Board Test*** and connection.
REMOTE CONTROL PROBLEMS		
The hand/foot amptrol has no control.	1. Machine set for 4-step trigger, should be set for 2-step. 2. Start current set too high. 3. Set for 2-step trigger. 4. Reduce start current.	1. Perform the ***Control Board Test***.

⚠ CAUTION

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

Observe Safety Guidelines detailed in the beginning of this manual.

TROUBLESHOOTING GUIDE

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
GAS PROBLEMS		
The gas will not turn off.	1. The postflow time may be set too long. 2. Turn the welder OFF. If the gas still flows, the solenoid is defective.	1. Perform the ***Gas Solenoid Test***.
No gas flow.	1. Bad hose connection from solenoid to electrode stud.	1. Perform the ***Gas Solenoid Test***. 2. Perform the ***Control Board Test***.
HI-FREQ PROBLEMS		
No high frequency in TIG mode.	1. Preflow time set too long. 2. Verify process is set for high frequency Tig. 3. Set for typical 0.5 second preflow time.	1. Perform the ***High Frequency & Output Bypass Circuit Board Test***. 2. Perform the ***Control Board Test***.
High frequency does not initiate an arc.	1. Insufficient gas flow. Check gas flow, ARGON must be flowing for HF to be established. 2. Poor work clamp connection. 3. Contaminated tungsten. 4. Faulty torch.	1. Perform the ***High Frequency & Output Bypass Circuit Board Test***.

⚠ CAUTION

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

Observe Safety Guidelines detailed in the beginning of this manual.

TROUBLESHOOTING GUIDE

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
115V AUXILIARY OUTPUT PROBLEMS		
No 115 VAC output.	1. Check 115V circuit breaker. 2. Faulty receptacle or connection.	1. Check thermostat J1 pins 1 and 2 on 115V auxiliary board. See Wiring Diagram. 2. Perform the ***115V auxiliary Board Test***.
WATER COOLER PROBLEMS		
NOTE: If cooler control cable is connected to or disconnected from machine when machine is already turned on, machine must be recycled by turning off and then on so the cooler is recognized by machine; failure to do this may damage Tig torch when welding.		
Indicator light on cooler does not turn on.	1. Cooler is not plugged in. Plug cooler in to 115V receptacle.	1. Perform the ***115V auxiliary Board Test***.
Tig torch runs hot.	1. Cooler control cable is not plugged in. 2. Turn machine OFF, plug in cooler control cable, then turn machine ON.	1. Torch may be faulty.
Machine display ERR 11 when welding.	1. Insufficient water in cooler. 2. Air in water line. 3. Faulty cooler. 4. Activate trigger and depress flow sensor bypass switch to prime cooler.	1. N/A.

⚠ CAUTION

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

Observe Safety Guidelines detailed in the beginning of this manual.

TROUBLESHOOTING GUIDE

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
TIG WELDING PROBLEMS		
Poor starting.	1. Poor work clamp connection. 2. Wrong "DIA" setting. 3. Starting current may be too low. 4. Access "GTAW" menu (see Operation section of Operators Manual) and set DIA for IntelliStart "INTL" or proper tungsten size.	1. Perform the ***Gas Solenoid Test***. 2. Perform the ***Output Board Test***. 3. Perform the ***Discharge Resistor Module Test***. 4. Perform the ***Voltage Doubler Rectifier Module Test***.
Black area along weld bead.	1. There may be oily or organic contamination on work piece. 2. Tungsten electrode may be contaminated. 3. There may be leaks in gas line or torch connection.	1. Perform the ***Gas Solenoid Test***. 2. Perform the ***Discharge Resistor Module Test***.
Output quits momentarily; gas flow & high frequency are also interrupted.	1. May be caused by high frequency interference. 2. Faulty high frequency board or connection. 3. Check for proper machine ground connection; surrounding machines that generate high frequency also should be grounded properly.	1. Perform the ***Gas Solenoid Test***. 2. Perform the ***High Frequency & Output Bypass Circuit Board Test***. 3. Perform the ***Discharge Resistor Module Test***.

⚠ CAUTION

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

Observe Safety Guidelines detailed in the beginning of this manual.

TROUBLESHOOTING GUIDE

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
TIG WELDING PROBLEMS		
Arc flutters.	1. The electrode may be too large for current setting. 2. There may be insufficient gas shielding. 3. There may be contaminated gas or leaks in gas line, torch or connections.	1. Make sure that B4 (chassis) connection to the output board is connected and is electrically good (no corrosion). 2. Perform the ***Gas Solenoid Test***. 3. Perform the ***Output Board Test***. 4. Perform the ***Discharge Resistor Module Test***. 5. Perform the ***Voltage Doubler Rectifier Module Test***.
Insufficient cleaning.	1. AC balance is not in Auto setting. 2. Waveshape settings may not suit application. Set for manual balance and increase EP or reduce balance percentage (EP = Electrode Positive).	1. Perform the ***Output Board Test***. 2. Perform the ***Discharge Resistor Module Test***.
Insufficient penetration.	1. AC balance is not in Auto setting. 2. Waveshape settings may not suit application. Set for manual balance and increase EN or balance percentage (EN = Electrode Negative).	1. N/A.
Unstable arc.	1. Wrong Waveform setting. Access "GTAW" menu (see Operation section of Operators Manual) and change "Wave" setting to "SQRE" or "Soft" (SQRE = square wave. See extended menu A). 2. AC frequency may not suit application.	1. Perform the ***Output Board Test***.

⚠ CAUTION

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

Observe Safety Guidelines detailed in the beginning of this manual.

TROUBLESHOOTING GUIDE

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
TIG WELDING PROBLEMS		
Tail-out current too high.	1. Wrong Tig menu setting. Access "GTAW" menu (see Operation section of Operators Manual) and change "DIA" to "INTL". 2. Start current may be set too high.	1. N/A.
Output shuts off during welding.	1. Spot timer may be turned on inadvertently. Access "GTAW" menu (see Operation section of Operators Manual) and change "SPOT" to "OFF".	1. Check discharge resistors and connection. 2. Perform the ***Output Board Test***. 3. Perform the ***Inverter Board Test***.
Arc randomly goes out. (Arc rectification)	1. Poor work clamp connection.	1. Check the background choke & connections to the output board. 2. Perform the ***Voltage Doubler Rectifier Module Test***. 3. Perform the ***Output Board Test***.
Low OCV in HF Tig AC or DC, poor welding.	1. Make sure the correct input voltage is being applied to the machine.	1. Perform the ***Voltage Doubler Rectifier Module Test***.

⚠ CAUTION

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

Observe Safety Guidelines detailed in the beginning of this manual.

TROUBLESHOOTING GUIDE

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
STICK WELDING PROBLEMS		
Poor starting.	1. Hot start may be set too low. 2. Poor work clamp connection. 3. Access "SMAW" menu (see Operation section of the Operators Manual) and increase "HSTR" setting (HSTR = hot start) found in extended menu B.	1. N/A.
Stick electrode "blasts off" when arc is struck.	1. Current may be set too high for electrode size. 2. Hot start set too high. 3. Access "SMAW" menu (see Operation section of the Operators Manual) and reduce "HSTR" setting (HSTR = hot start) found in extended menu B.	1. Perform the ***Output Board Test***. 2. Perform the ***Discharge Resistor Module Test***.
Electrode "sticks" in weld puddle.	1. Current may be set too low for electrode size. 2. Arc force set too low. 3. Access "SMAW" menu (see Operation section of the Operators manual) and increase "FRCE" setting (FCRE = Arc Force in extended menu B).	1. Perform the ***Output Board Test***. 2. Perform the ***Discharge Resistor Module Test***.
Insufficient penetration.	1. Wrong process setting. 2. Access "SMAW" menu (see Operation section of the Operators manual) and increase "FRCE" setting (FCRE = Arc Force in extended menu B).	1. Perform the ***Output Board Test***. 2. Perform the ***Discharge Resistor Module Test***. 3. Check the Pre-Charge winding to be connected to the output board (see machine diagram J03 on output board.
Poor low end Tig DC welding (no background).	1. N/A.	1. Background choke is open or disconnected (see machine diagram in G section for J05 connector on the output board disconnected.

⚠ CAUTION

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

Observe Safety Guidelines detailed in the beginning of this manual.

TROUBLESHOOTING GUIDE

ERROR CODE #	DESCRIPTION	POSSIBLE CAUSE	CORRECTIVE ACTION
		ERROR CODES	
01	INPUT VOLTAGE TOO LOW.	INPUT VOLTAGE SHOULD BE BETWEEN 200-600 VAC.	CONNECT MACHINE TO 200-600 VAC INPUT. EXTENSION CORDS UNDER SIZED OR TOO LONG CAN CAUSE THIS TO OCCUR WHEN ONLY WELDING WITH THE ASPECT. WELDING CAUSED THE INPUT CURRENT TO INCREASE, CAUSING THE VOLTAGE TO DROP IN THE UNDER SIZED EXTENSION OR TOO LONG CORD. SIZE THE CORD FOR THE ASPECTS MAX CURRENT DRAW. TRY THE SAME WELD TO TEST WITHOUT THE EXTENSION CORD.
02	INPUT VOLTAGE TOO HIGH.	INPUT VOLTAGE SHOULD BE BETWEEN 200-600 VAC OR A VOLTAGE SPIKE ABOVE 600V WHILE UNDER LOAD.	CONNECT MACHINE TO 200-600 VAC INPUT. SINGLE PHASE SHOULD BE 200-230 VAC. SOME GENERATOR SUPPLIES CAN CAUSE EXCESSIVE VOLTAGE SPIKES NOT MEASURABLE WITH TYPICAL MULTI METERS. TRY SUPPLYING POWER FROM CITY MUNICIPAL POWER. IF THE ERROR DOES NOT OCCUR, THE GENERATOR CAN CAUSE THIS PROBLEM. AVOID COILING UP INPUT EXTENSION CORDS SUPPLYING THE WELDER.
05	AC SWITCH OVERLOAD.	OVERLOAD CONDITION ON THE OUTPUT SIDE OF THE MACHINE.	TURN THE MACHINE OFF THEN ON TO CLEAR THE FAULT AND RESUME OPERATION. THERE IS A THERMAL DEVICE IN THE AC SWITCH MODULE ON THE OUTPUT BOARD. PERFORM THE NTC THERMAL DEVICE PART OF THE ***OUTPUT BOARD TEST***. PERFORM THE ***DISCHARGE RESISTOR MODULE TEST***. THE THERMISTOR COULD BE OPEN. SEE THE THERMAL DEVICE TEST SECTION. PERFORM THE ***OUTPUT BOARD TEST***.
06	INVERTER VOLTAGE LOCK OUT.	INTERNAL AUXILIARY VOLTAGE FAULT CONDITION HAS OCCURRED +15 SUPPLY IS TOO LOW.	TURN THE MACHINE OFF THEN ON TO CLEAR THE FAULT AND RESUME OPERATION. THE INPUT POWER BOARD IS HAVING PROBLEMS GENERATING ITS VOLTAGES. CYCLE THE POWER TO SEE IF ANY BOARDS ARE DEMONSTRATING ANY PROBLEMS FROM A NORMAL BOOT UP. SEE ALL THE BOARDS TESTS IN THE ***TROUBLESHOOTING AND REPAIR SECTION***. LIKE AN LED TEST THAT OCCURS ON THE UI BOARD. TRY UNPLUGGING ANY REMOTES WIRELESS OR STANDARD TYPE. THE WIRELESS REMOTE SUPPLY CAN BE DRAGGING DOWN THE INPUT POWER BOARD KEEPING IT FROM BUILDING UP THE OTHER SUPPLIES.
11	WATER COOLER FAULTY.	COOLER FLUID IS NOT CORRECTLY FLOWING THROUGH THE TORCH / COOLER. A FAULTY FLOW SENSOR INSIDE COOLER.	CHECK CONNECTIONS BETWEEN TORCH AND COOLER. BE SURE TO PRIME THE PUMP USING THE SUPPLIED BYPASS HOSE. COOLER IS NOT PLUGGED INTO 115 OR DURING WELDING THE COOLER SUPPLY OF 115 DROPS DURING WELDING. TEST BY PLUGGING YOUR EXTERNAL EQUIPMENT INTO A SEPARATE 115V SUPPLY.

⚠ CAUTION

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

CASE COVER REMOVAL AND REPLACEMENT PROCEDURE

⚠ WARNING

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

TEST DESCRIPTION

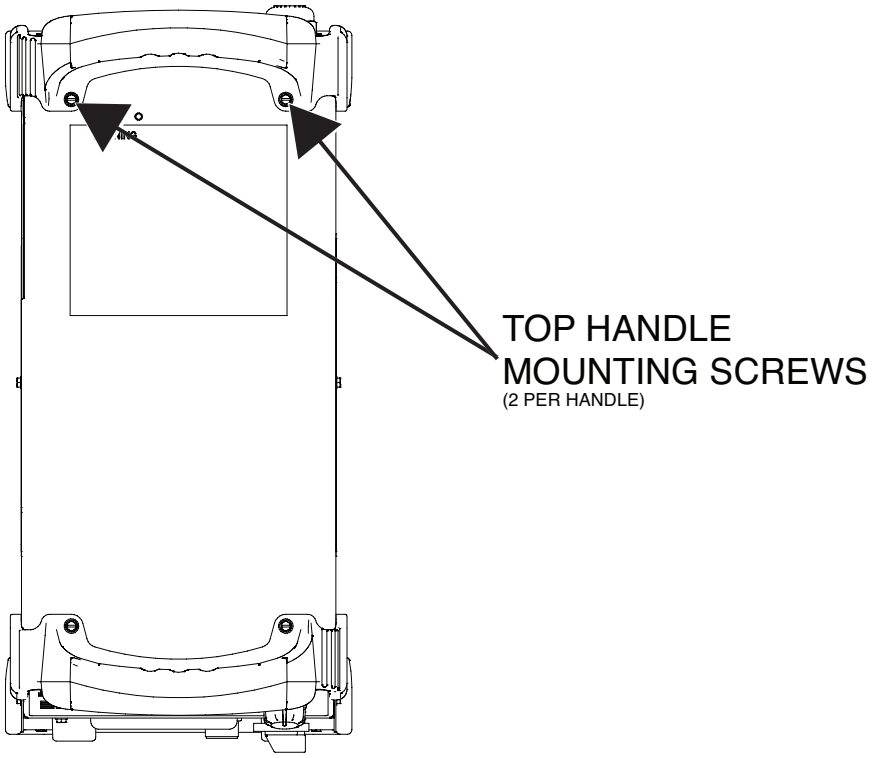
This procedure will aid the technician in the removal and replacement of the Case Covers.

MATERIALS NEEDED

5/16” Nutdriver

CASE COVER REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

Figure F.1 – Top handle mounting screw locations



REMOVAL PROCEDURE

1. Remove the input power to the Aspect 375 machine.
2. Using a 5/16” nutdriver, remove the eight screws and washers (two on top, two on each side and two on the rear) securing the rear handle to the machine. See Figure F.1 and ***Figure F.2***. Note washer placement for reassembly.
3. Using a 5/16” nutdriver, remove the eight screws and washers (two on top, two on each side and two on the front) securing the front handle to the machine. See Figure F.1 and ***Figure F.2***. Note washer placement for reassembly.
4. Using a 5/16” nutdriver, remove side screw from each of the four corner caps. See ***Figure F.2***.
5. Using a 5/16” nutdriver, remove the six screws securing the right case side to the machine. See ***Figure F.3***.
6. Using a 5/16” nutdriver, remove the three screws securing the case wraparound to the machine. See ***Figure F.4***.
7. The case covers can now be removed.

CASE COVER REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

Figure F.2 – Side handle mounting screw and corner cap mounting screw locations

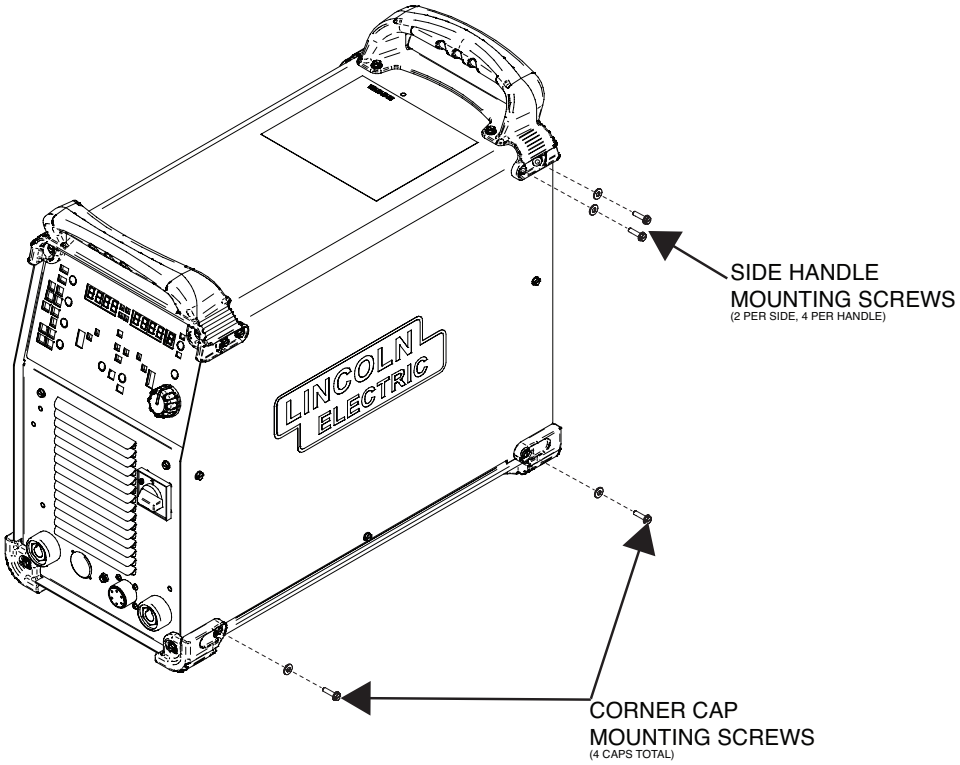
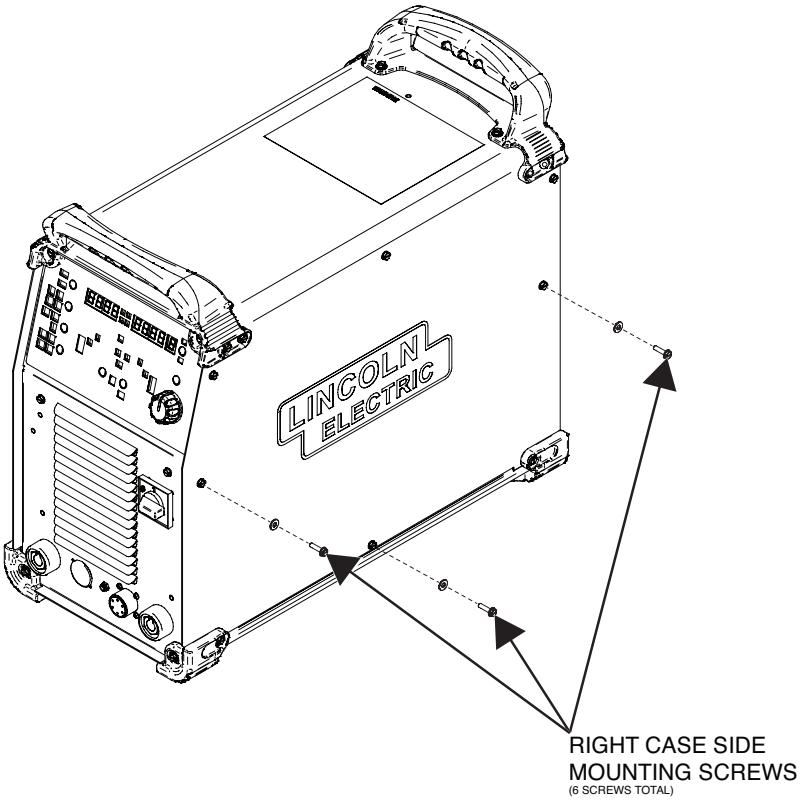
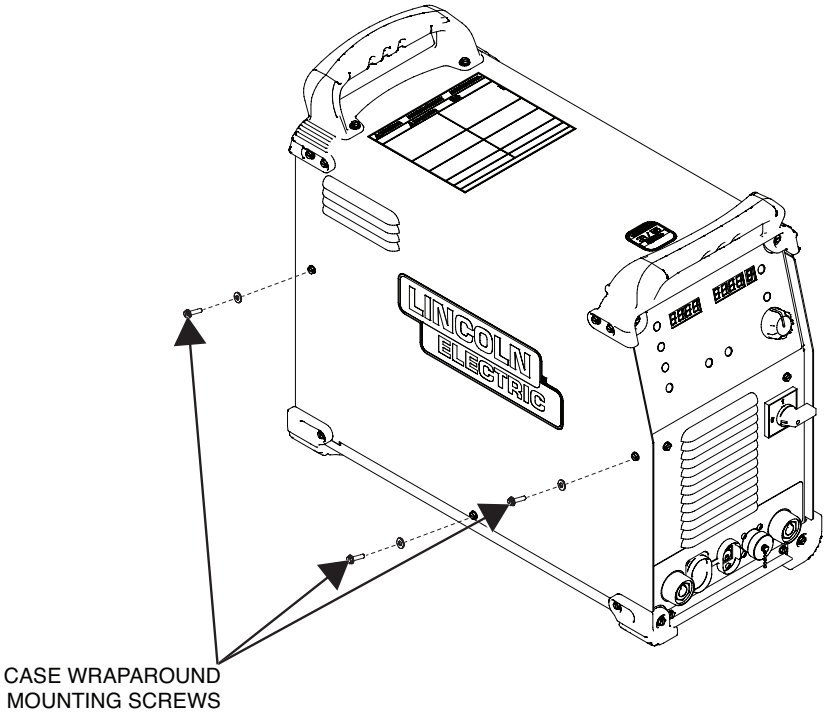


Figure F.3 – Right case side mounting screw locations



CASE COVER REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

Figure F.4 – Case wraparound mounting screw locations



REPLACEMENT PROCEDURE

1. Carefully position the case wraparound onto the machine.
2. Using a 5/16” nutdriver, attach the three screws securing the case wraparound to the machine.
3. Carefully position right case side onto the machine.
4. Using a 5/16” nutdriver, attach the six screws securing the right case side to the machine.
5. Using a 5/16” nutdriver, attach the side screw to each of the four corner caps.
6. Using a 5/16” nutdriver, attach the eight screws and washers (two on top, two on each side and two on the front) securing the front handle to the machine.
7. Using a 5/16” nutdriver, attach the eight screws and washers (two on top, two on each side and two on the rear) securing the rear handle to the machine.

CAPACITOR DISCHARGE PROCEDURE

⚠ WARNING

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

TEST DESCRIPTION

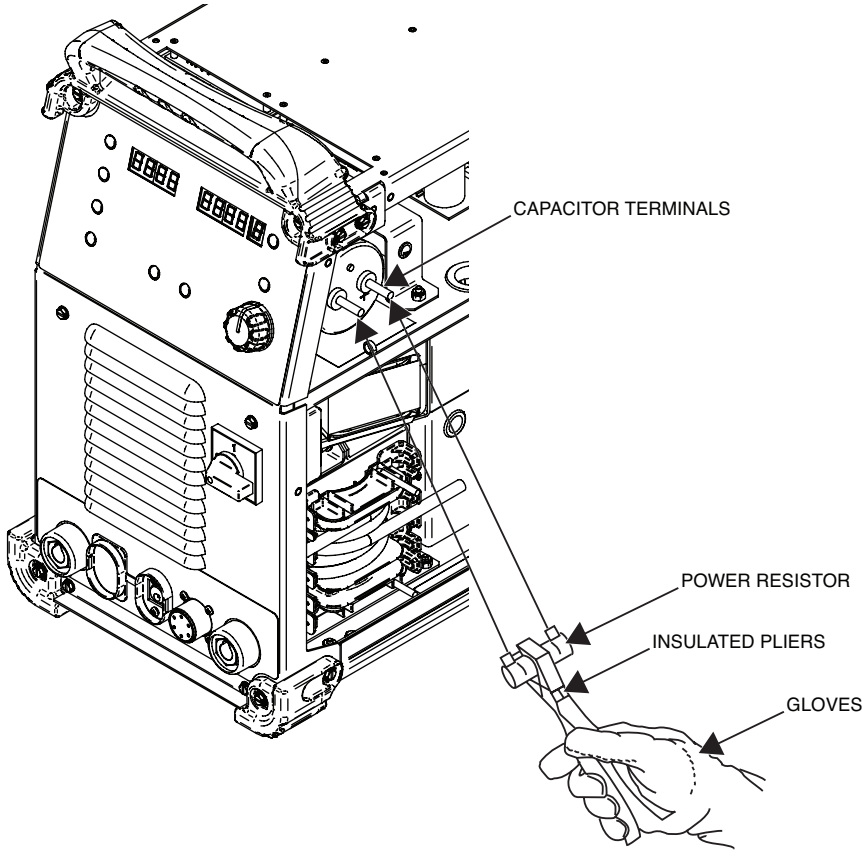
This procedure will drain off any charge stored in the capacitors that are part of the switch board assemblies. This procedure MUST be performed as a safety precaution before conducting any test or repair that requires you to touch internal components of the machine.

MATERIALS NEEDED

Digital Volt/Ohmmeter (Fluke 87 or better)
Insulated Gloves
Insulated Pliers
High Wattage Resistor (25-1000 Ohms/25Watt) LECO Part: S10404-57
Wiring Diagram

CAPACITOR DISCHARGE PROCEDURE *(continued)*

Figure F.5 – Capacitor discharge and location



PROCEDURE

1. Remove the input power to the Aspect 375 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Locate the 400 VDC bus capacitor on the right side of the welder. See Figure F.5.

⚠ WARNING

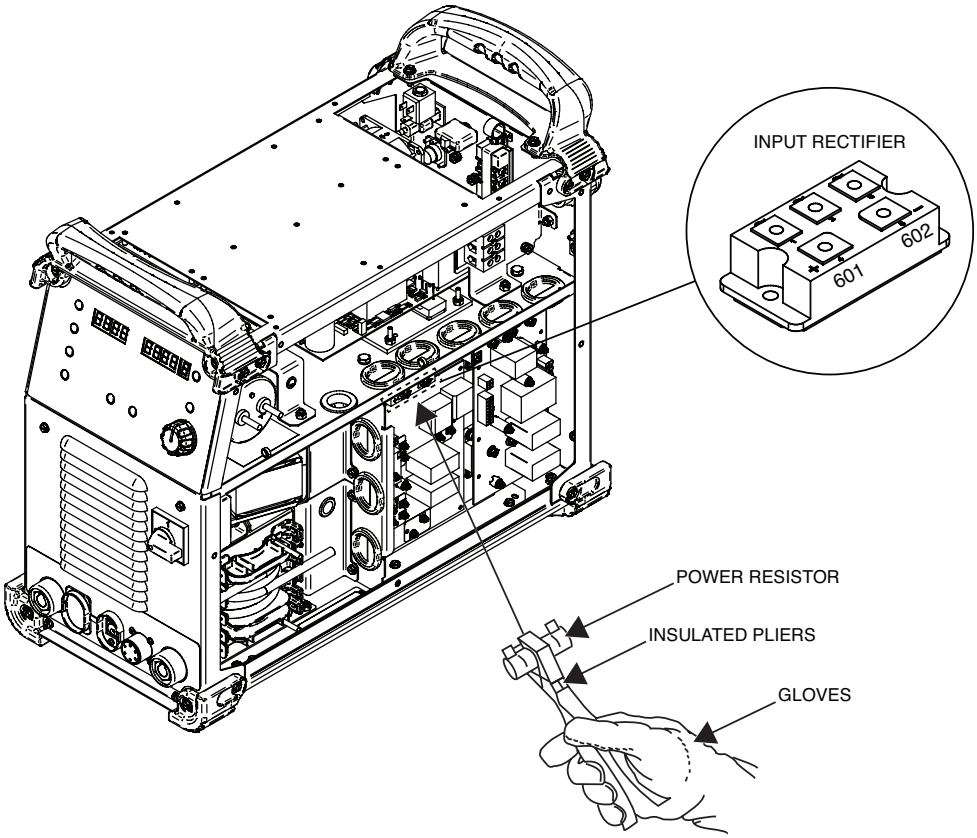
ELECTRIC SHOCK can kill.

- **Have a qualified individual install and service this equipment.**
- **Turn the input supply power OFF at the disconnect switch or fuse box before working on this equipment.**
- **Do not touch electrically hot parts.**

4. Locate the input rectifier. See ***Figure F.6***.
5. Locate the Output Board. See ***Figure F.7***.
6. Be careful not to make contact with the capacitor terminals, the input rectifier or the output board at this time.
7. Obtain a high resistance (25-1000 ohms) and 25 watts minimum resistor (LECO part: S10404-57). This resistor is not supplied with the machine. **NEVER USE A SHORTING STRAP FOR THIS PROCEDURE**.
8. Locate the two capacitor terminals. See Figure F.5.
9. Locate leads 601 and 602 on the input rectifier. See ***Figure F.6***.
10. Locate the terminals on and near the output board. See ***Figure F.7***.
11. Using electrically isolated gloves and insulated pliers, hold the body of the resistor and connect the resistor terminals across the two capacitor terminals. Hold the resistor in place for ten seconds.

CAPACITOR DISCHARGE PROCEDURE *(continued)*

Figure F.6 – Input rectifier discharge and location



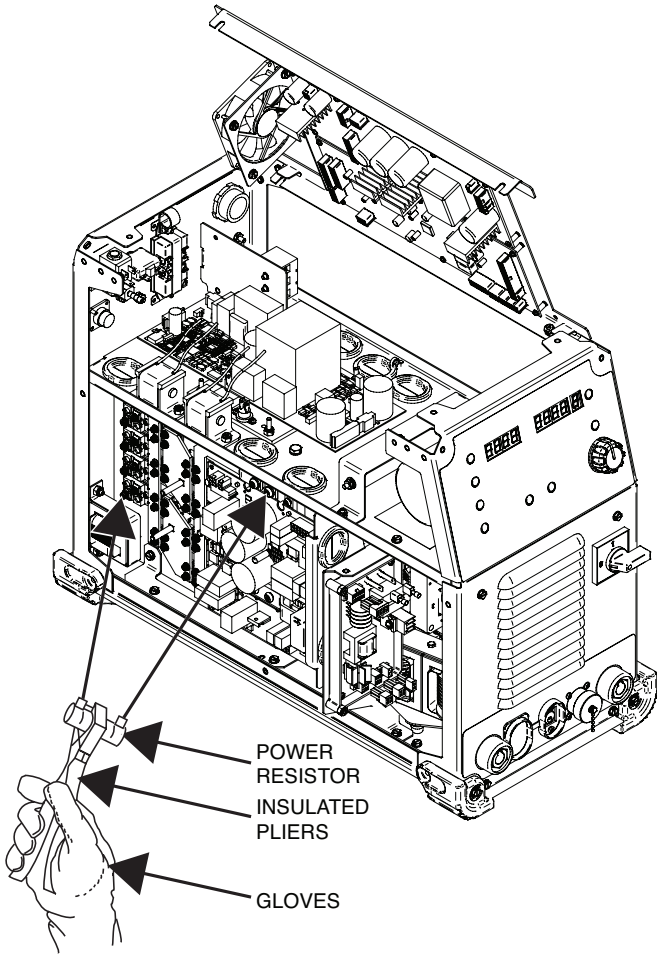
12. Using electrically isolated gloves and insulated pliers, hold the body of the resistor and connect the resistor to terminals 601 and 602 at the input rectifier. Hold the resistor in place for ten seconds.

NOTE: Do not touch the capacitor or input rectifier with your bare hands.

13. Check voltage across terminals of the capacitor and the input rectifier with a DC volt meter. Polarity of the capacitors are marked. Voltage on the meter should be zero for all areas of the components. If any voltage remains, repeat this discharge procedure until there is zero VDC measured.
14. Perform the ***Case Cover Replacement Procedure***.

CAPACITOR DISCHARGE PROCEDURE *(continued)*

Figure F.7 – Output board section



PRE-TEST PROCEDURE

⚠ WARNING

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

TEST DESCRIPTION

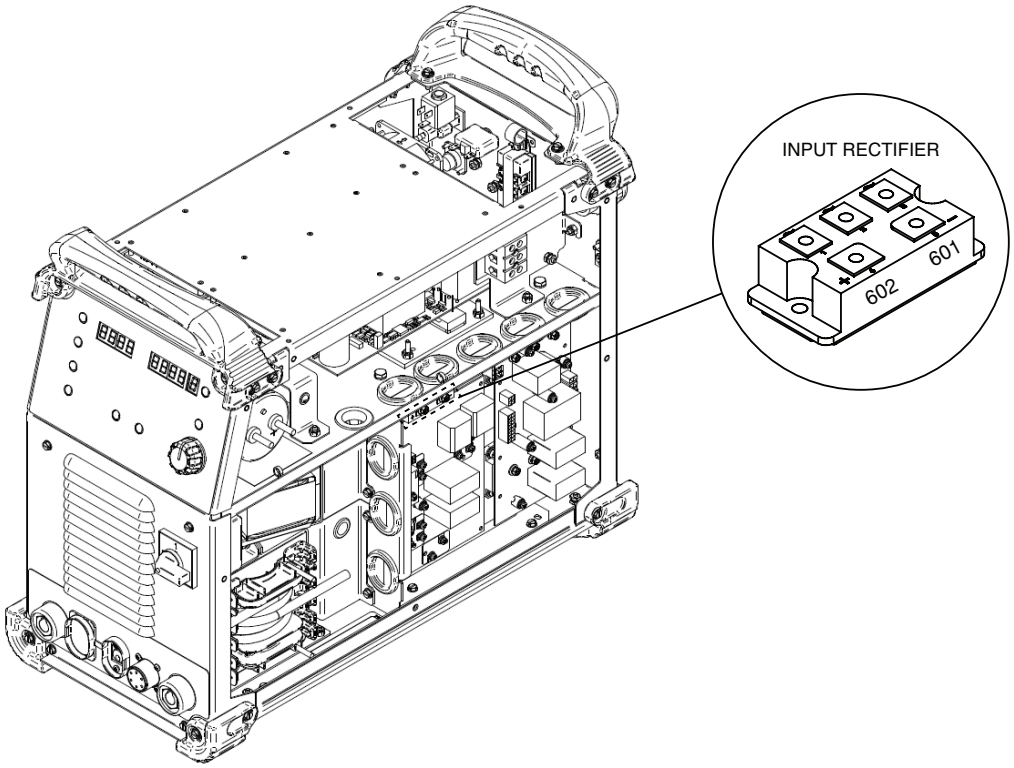
This test will help in determining if input power should be applied to this welder for further testing.

MATERIALS NEEDED

Phillips Screwdriver
Wiring Diagram

PRE-TEST PROCEDURE *(continued)*

Figure F.8 – Input rectifier lead location



PROCEDURE

1. Remove the input power to the Aspect 375 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Capacitor Discharge Procedure***.
4. Carefully maneuver the top tray into the upright position by tilting the top tray up and to the right. A non-conductive brace will need to be used to hold the top tray in the upright position.
5. Perform a complete visual inspection of all the boards and modules in the welder.
6. Look for any white or black soot or over heated components, modules or printed circuit boards.
7. Perform the ***Input Rectifier Test***, forward voltage drop section.
8. Perform the ***Buck/Boost Board & IGBT Test***, forward voltage drop section.
9. Using a phillips screwdriver, remove lead 602(DC+) from the input rectifier and electrically isolate. See Figure F.8. See Wiring Diagram.
10. Carefully apply the correct input power to the machine. With lead 601 removed, no high voltage will be supplied to the buck/boost boards or the inverter board.
11. Observe the 4 green LEDs on the input power board with single phase and 5 LEDs with three phase. After five seconds LEDs 4 and 5 will turn off. The buck boost relay will produce an audible click meaning pre charge is completed. See Machine Diagram, for LED patterns and meaning.
12. The small fan on the top shelf (toward the rear) should be in motion.
13. With 230 VAC (single phase), check for 110 VDC at terminals 4 and 5. See Wiring Diagram.
14. Remove the input power to the Aspect 375 machine.
15. Perform the ***Capacitor Discharge Procedure***.
16. Reconnect the previously removed input rectifier lead 602.
17. Low power testing is complete.
18. If all looks normal, power can be applied for further testing and troubleshooting. Begin with 208 or 230 VAC input power. The final test should be performed with 460 VAC once the machine has been tested with lower input voltages. See the ***Retest After Repair Procedure***.

There are important printed circuit boards that need to be frame grounded, check the wiring diagram to make sure these connections are in place.

Input Power Board

Output Board

Control Board

HF Board

Input cord green wire and its toroid (two turns).

Various ceramic toroids are throughout the welder. Check the wiring diagram. They help reduce / reject electronic noise generated inside the welder. They should not be cracked or chipped.

OUTPUT DIODE MODULE TEST

⚠ WARNING

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

TEST DESCRIPTION

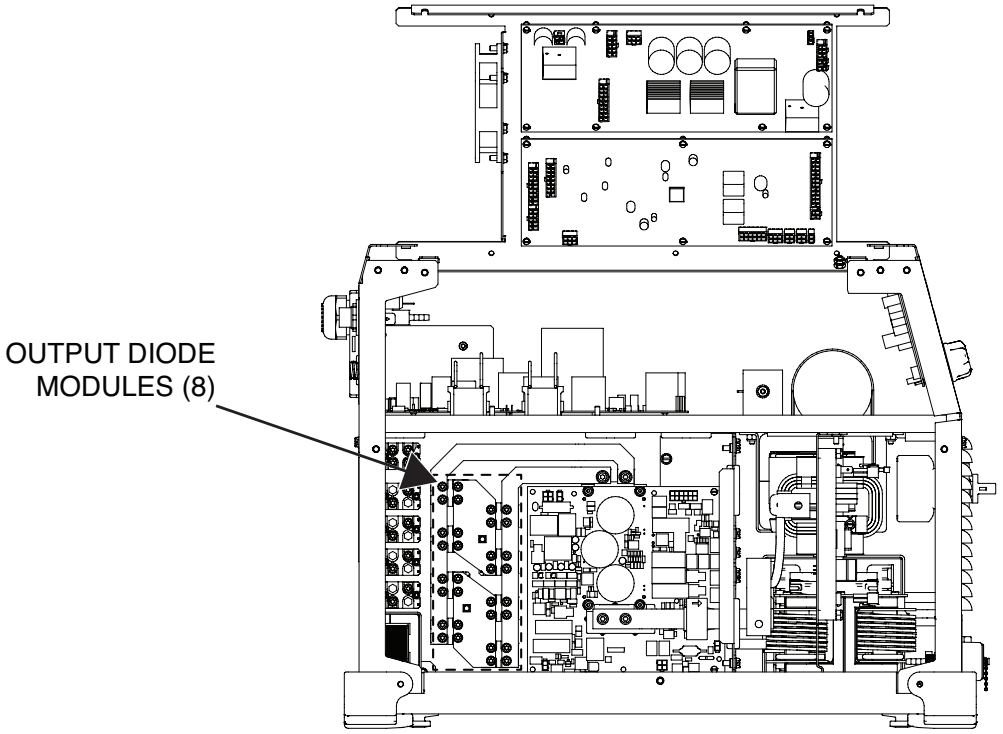
This test will help determine if the Output Diode Modules are functioning.

MATERIALS NEEDED

Digital Volt/Ohmmeter (Fluke 87 or better)
Torx Nutdriver (Size T20)
Wiring Diagram

OUTPUT DIODE MODULE TEST *(continued)*

Figure F.9 – Output diode modules location (left side of machine)

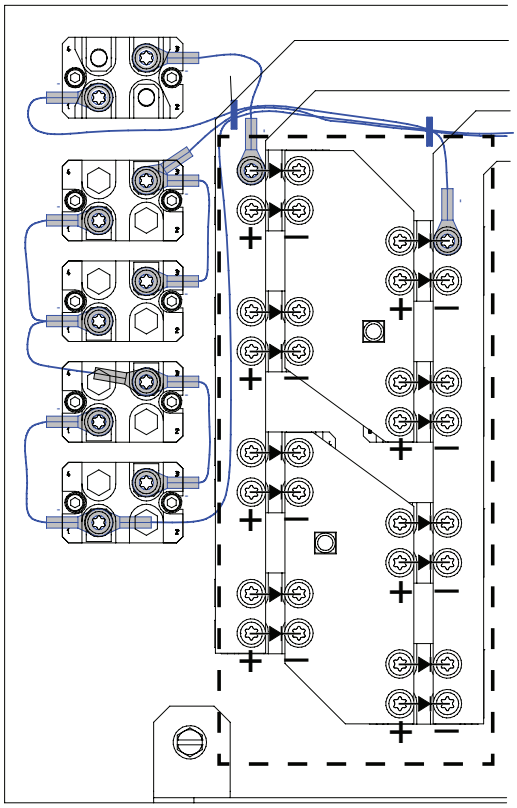


PROCEDURE

1. Remove the input power to the Aspect 375 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Capacitor Discharge Procedure***.
4. Locate the output diode modules. See Figure F.9.
5. Using a digital volt/ohmmeter (set to diode test), test each diode module as indicated per meter polarity probes (two diodes per module). The forward voltage drop should be .18 VDC volts +/- 20%. There are 8 modules total, 16 diodes to test. If any of diodes test out of spec, 0 volts (shorted) or overload (open), the module may be faulty. See ***Figure F.10***. See ***Table F.1***.
6. Using a Torx nutdriver (size T20), remove the bus bar on the faulty diode module and retest the diode module to verify. Retesting out of circuit will be at approximately .37 VDC forward drop +/- 20% per diode. See ***Figure F.10***. See ***Table F.1***.
7. If diode is faulty, perform the ***Output Diode Module Removal And Replacement Procedure***.
8. Perform the ***Case Cover Replacement Procedure***.

OUTPUT DIODE MODULE TEST *(continued)*

Figure F.10 – Output diode module test points



OUTPUT DIODE MODULES
UNDER TEST (8 TOTAL)
(2 DIODES PER MODULE 16
MEASUREMENTS TOTAL)

Table F.1 – Diode module forward voltage drop

	+/- 20% ERROR OF FORWARD VOLTAGE DROP
DIODE MODULE IN CIRCUIT = .18VDC FORWARD VOLTAGE DROP	.144 TO .216 VDC
DIODE MODULE OUT OF CIRCUIT = .37VDC FORWARD DROP	.296 TO .44 VDC

DISCHARGE RESISTOR MODULE TEST

⚠ WARNING

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

TEST DESCRIPTION

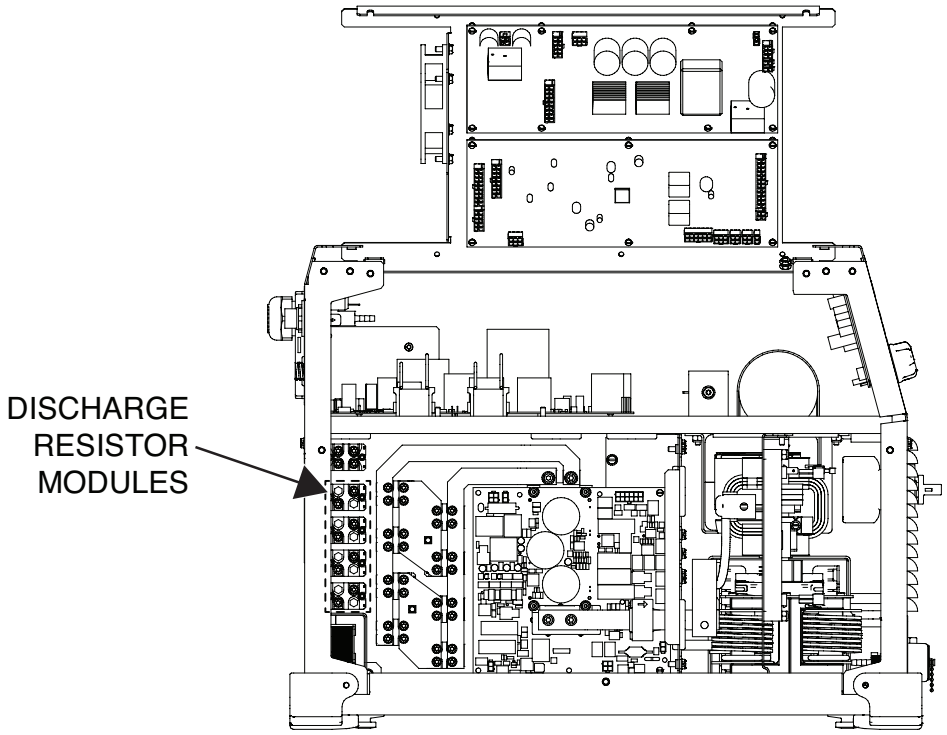
This test will help determine if the Discharge Resistor Module is functioning.

MATERIALS NEEDED

Digital Volt/Ohmmeter (Fluke 87 or Better)
Torx Nutdriver (Size T20)
Wiring Diagram

DISCHARGE RESISTOR MODULE TEST *(continued)*

Figure F.11 – Discharge resistor modules location (left side of machine)

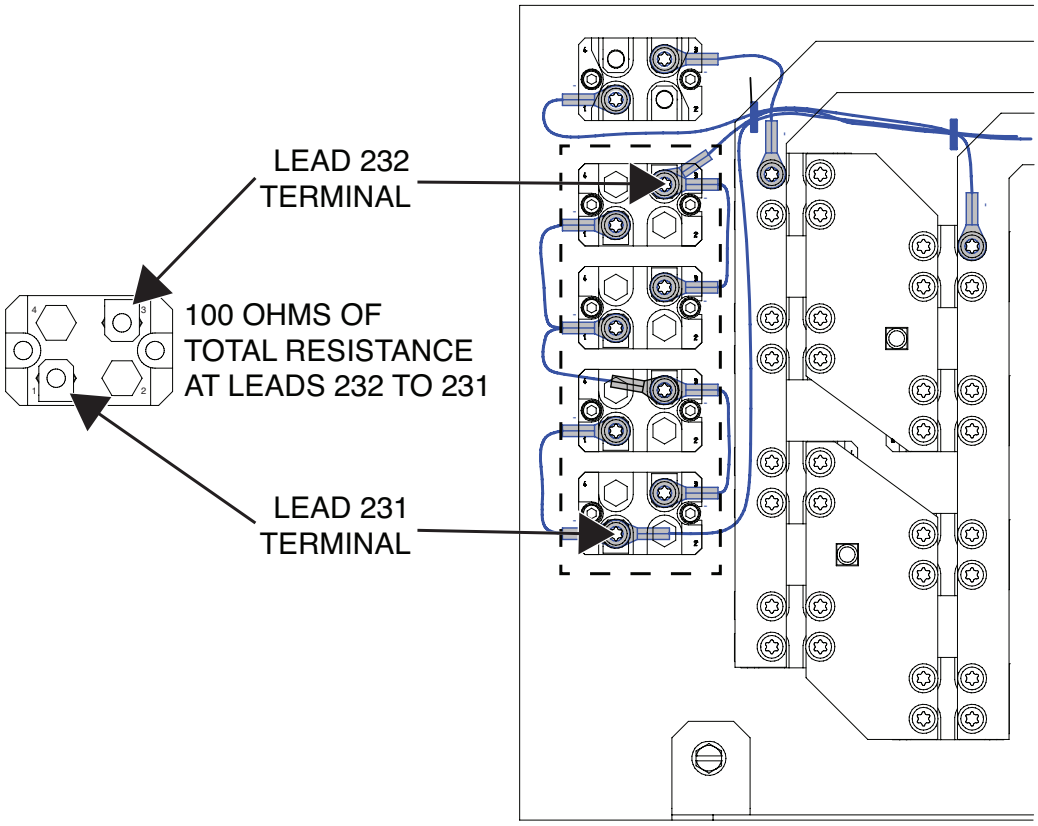


PROCEDURE

1. Remove the input power to the Aspect 375 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Capacitor Discharge Procedure***.
4. Locate the discharge resistor modules. See Figure F.11.
5. Using a digital volt/ohmmeter (set for ohms), measure the total resistance from lead 232 to lead 231. Each resistor module has 100 ohms of resistance. See ***Figure F.12***. See Wiring Diagram.
6. The wiring for the modules are configured for 2 in parallel in series with 2 in parallel. If you measure 0 ohms, one or more is shorted. If 100 ohms is not measured, each resistor needs to be disconnected and tested to be measured individually for 100 ohms for each resistor. See ***Figure F.12***. See Wiring Diagram.
7. If the module test fails, the module may be faulty.
8. If faulty, perform the ***Discharge Resistor Module Removal And Replacement Procedure***.
9. Perform the ***Case Cover Replacement Procedure***.

DISCHARGE RESISTOR MODULE TEST *(continued)*

Figure F.12 – Discharge resistor module test points



VOLTAGE DOUBLER RECTIFIER MODULE TEST

⚠ WARNING

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

TEST DESCRIPTION

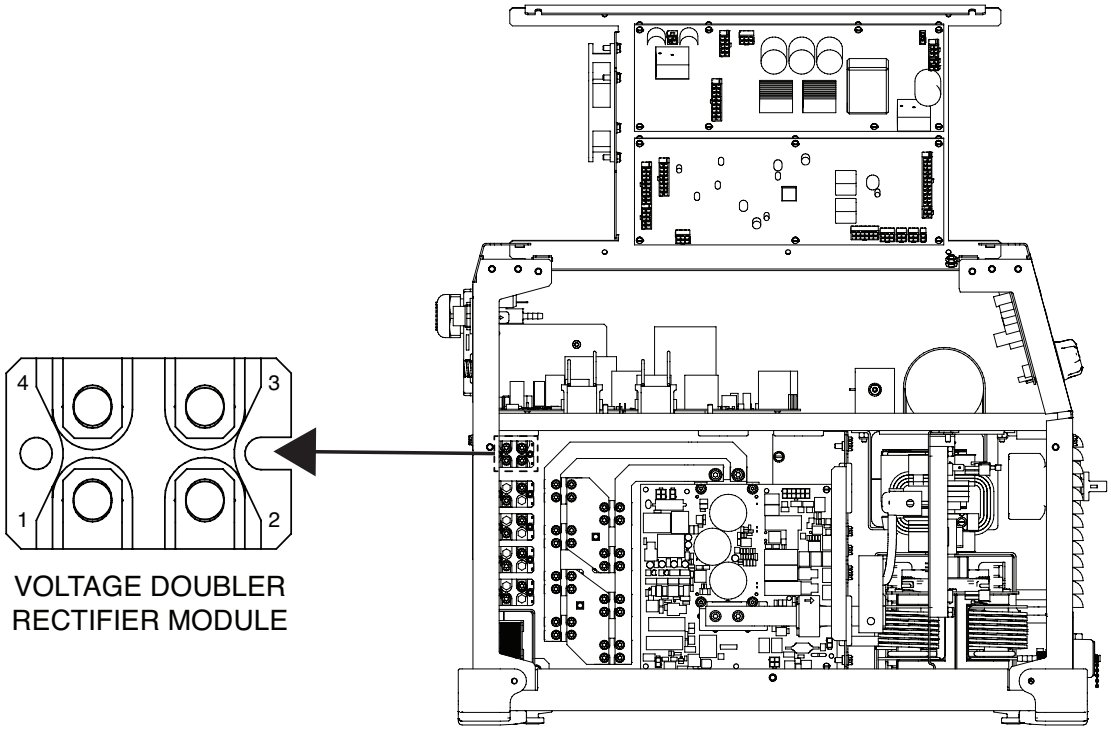
This test will help determine if the Voltage Doubler Rectifier Module is functioning.

MATERIALS NEEDED

Digital Volt/Ohmmeter (Fluke 87 Or Better)
Torx Nutdriver (Size T20)
Wiring Diagram

VOLTAGE DOUBLER RECTIFIER MODULE TEST *(continued)*

Figure F.13 – Voltage doubler rectifier module location



PROCEDURE

1. Remove the input power to the Aspect 375 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Capacitor Discharge Procedure***.
4. Locate the voltage doubler rectifier module. See Figure F.13.
5. Using a digital volt/ohmmeter (set to diode test), perform the tests outlined in ***Table F.2***. There are 4 diodes in each module. See ***Figure F.14***.
6. If any of the tests show out of spec, 0 volts (shorted) or overload (open), the module may be faulty.
7. Using a Torx nutdriver (size T20), remove the leads 213 and 214 from the diode module and retest. See ***Figure F.14***. See ***Table F.3***.
8. If the module is faulty, perform the ***Voltage Doubler Rectifier Module Removal And Replacement***.
9. Connect any previously removed leads. See Wiring Diagram.
10. Perform the ***Case Cover Replacement Procedure***.

VOLTAGE DOUBLER RECTIFIER MODULE TEST *(continued)*

Figure F.14 – Voltage doubler rectifier module test points

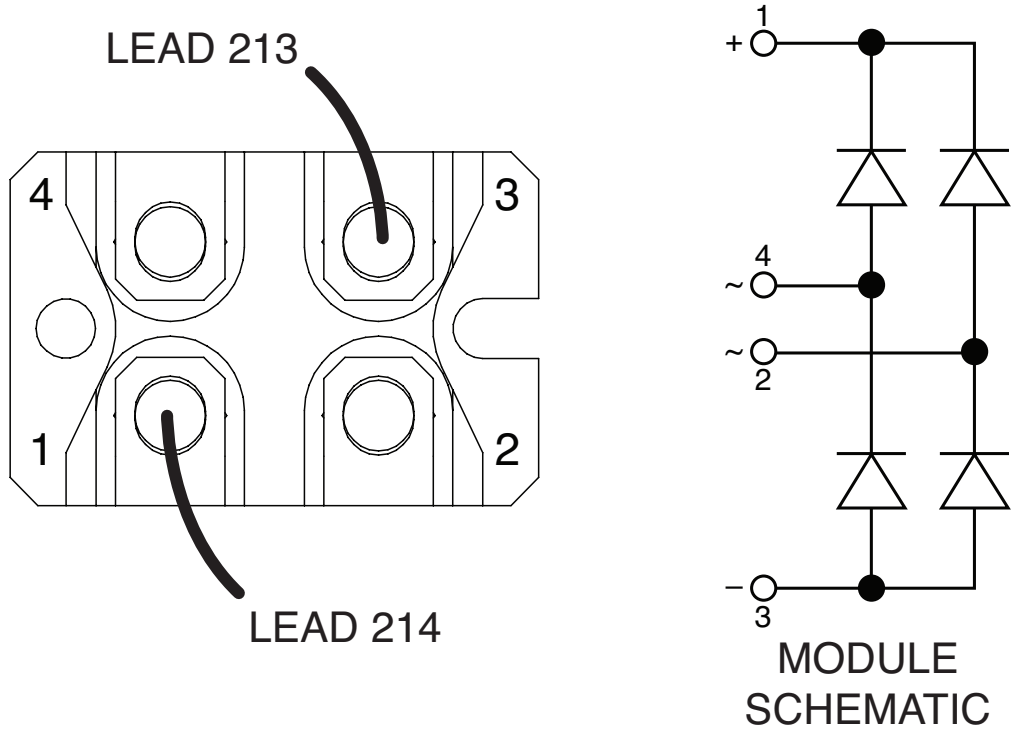


Table F.2 – In circuit (connected) tests

POSITIVE TEST PROBE	NEGATIVE TEST PROBE	EXPECTED RESULT
TERMINAL 4	TERMINAL 1	.18 TO 1.0 VDC FORWARD DIODE DROP
TERMINAL 2	TERMINAL 1	.18 TO 1.0 VDC FORWARD DIODE DROP
TERMINAL 3	TERMINAL 4	.18 TO 1.0 VDC FORWARD DIODE DROP
TERMINAL 3	TERMINAL 2	.18 TO 1.0 VDC FORWARD DIODE DROP

Table F.3 – Out of circuit (white leads removed) tests

POSITIVE TEST PROBE	NEGATIVE TEST PROBE	EXPECTED RESULT
TERMINAL 4	TERMINAL 1	.37 TO 1.0 VDC FORWARD DIODE DROP
TERMINAL 2	TERMINAL 1	.37 TO 1.0 VDC FORWARD DIODE DROP
TERMINAL 3	TERMINAL 4	.37 TO 1.0 VDC FORWARD DIODE DROP
TERMINAL 3	TERMINAL 2	.37 TO 1.0 VDC FORWARD DIODE DROP

INPUT RECTIFIER TEST

⚠ WARNING

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

TEST DESCRIPTION

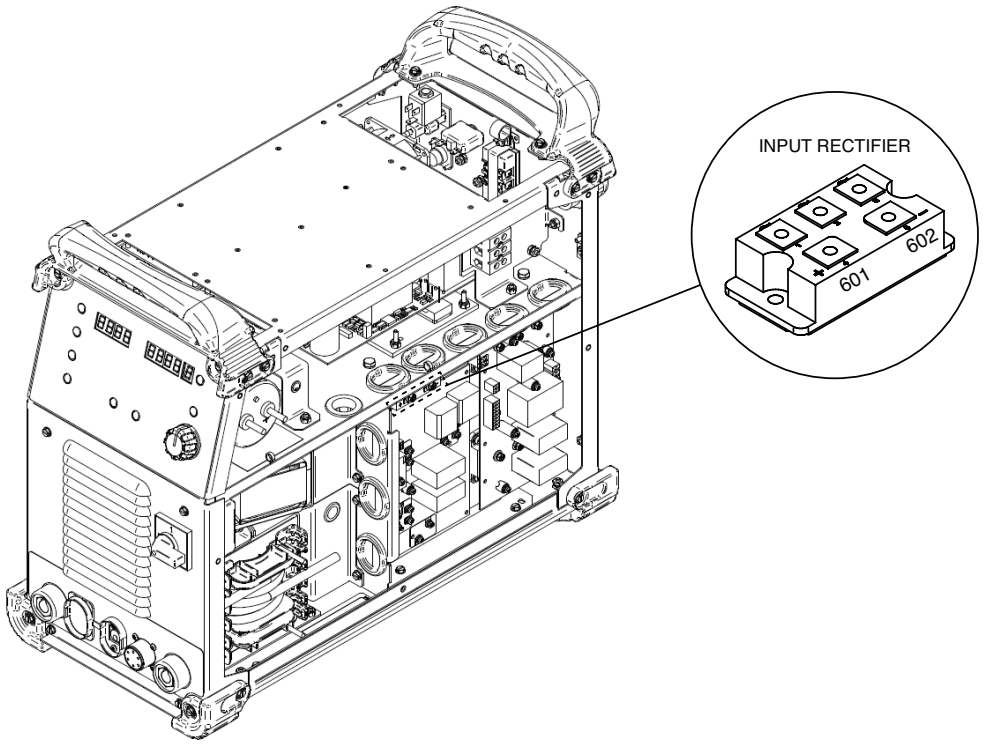
This test will help determine if the Input Rectifier is functioning.

MATERIALS NEEDED

Digital Volt/Ohmmeter (Fluke 87 Or Better)
Wiring Diagram

INPUT RECTIFIER TEST *(continued)*

Figure F.15 – Input rectifier location



PROCEDURE

1. Remove the input power to the Aspect 375 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Capacitor Discharge Procedure***.
4. Perform the ***Pre-Test Procedure***.
5. Locate the input rectifier. See Figure F.15.
6. Using a digital volt/ohmmeter (set for diode check), perform the tests outlined in ***Table F.4***. See ***Figure F.16***. See Wiring Diagram. Leads do not need to be removed.
7. If any of the tests fail, the input rectifier may be faulty. If faulty, perform the ***Input Rectifier Removal And Replacement Procedure***.

⚠ CAUTION

This area of the machine can hold a high DC voltage charge once the welder has been off for a period of time. Make sure to perform the *Capacitor Discharge Procedure*.

8. If the input rectifier is good on the forward voltage drop section test, connect any previously disconnected leads. See Wiring Diagram.
9. Carefully apply the correct input power to the machine.
10. Turn on the machine.
11. Using a digital volt/ohmmeter, measure the DC output voltage at terminals where leads 602 (POS) and 601 (NEG) are connected. See ***Figure F.16***. See Wiring Diagram. See ***Table F.5***, for typical output DC voltage.
12. If any of the DC voltages are not measured, the input rectifier may be breaking down when input power is applied. If the input AC voltage is measured on indicated terminals AA, BB, CC, phase to phase then the input rectifier may be faulty.
13. If faulty, perform the ***Input Rectifier Removal And Replacement Procedure***.
14. Perform the ***Case Cover Replacement Procedure***.

INPUT RECTIFIER TEST *(continued)*

Figure F.16 – Input rectifier test points

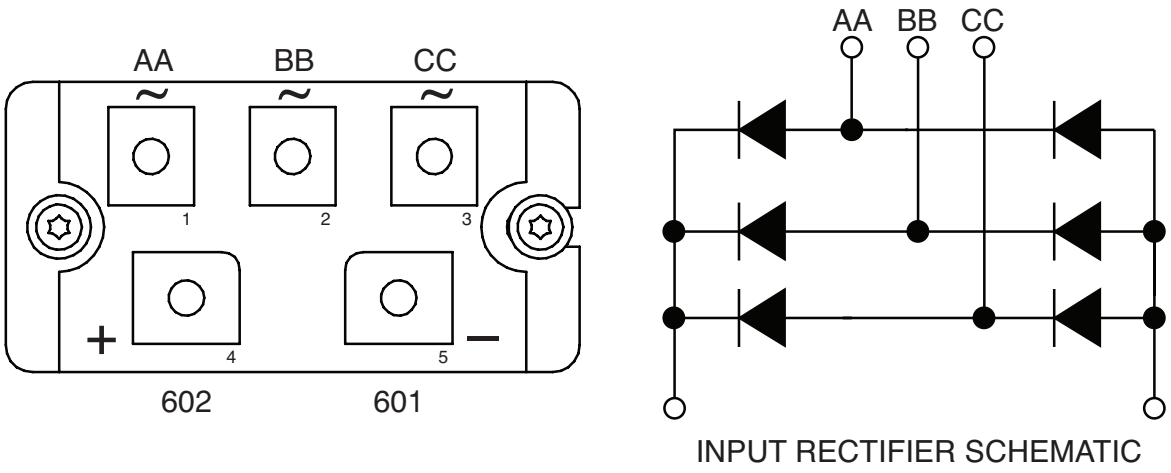


Table F.4 – Input rectifier test points (forward voltage drop section)

POSITIVE TEST PROBE	NEGATIVE TEST PROBE	EXPECTED RESULT
TERMINAL AA	TERMINAL 602 (+)	0.3 - 1.0V FORWARD DIODE DROP
TERMINAL BB	TERMINAL 602 (+)	0.3 - 1.0V FORWARD DIODE DROP
TERMINAL CC	TERMINAL 602 (+)	0.3 - 1.0V FORWARD DIODE DROP
TERMINAL 601 (-)	TERMINAL AA	0.3 - 1.0V FORWARD DIODE DROP
TERMINAL 601 (-)	TERMINAL BB	0.3 - 1.0V FORWARD DIODE DROP
TERMINAL 601 (-)	TERMINAL CC	0.3 - 1.0V FORWARD DIODE DROP

Table F.5 – Typical output DC voltage

TYPICALLY RECTIFIED THREE PHASE	
AC INPUT = DC	TEST METER PROBES LEAD NUMBER
208 VAC = 294 VDC	POSITIVE ON 602 NEGATIVE ON 601
230 VAC = 325 VDC	POSITIVE ON 602 NEGATIVE ON 601
460 VAC = 650 VDC	POSITIVE ON 601 NEGATIVE ON 602
575 VAC = 813 VDC	POSITIVE ON 602 NEGATIVE ON 601
600 VAC = 846 VDC	POSITIVE ON 602 NEGATIVE ON 601

GAS SOLENOID TEST

⚠ WARNING

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

TEST DESCRIPTION

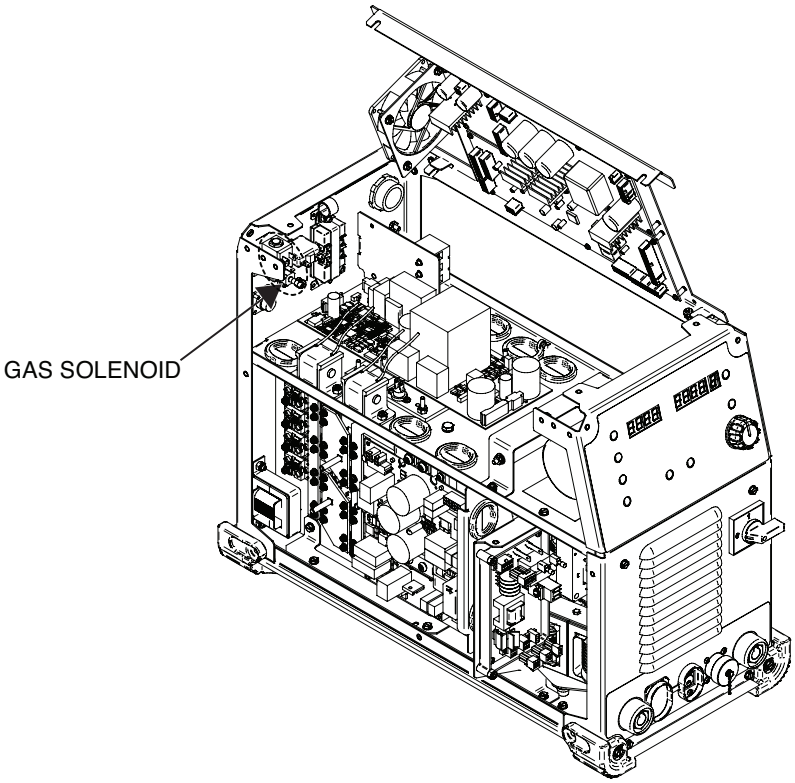
This test will help determine if the Gas Solenoid and associated boards are functioning.

MATERIALS NEEDED

Digital Volt/Ohmmeter (Fluke 87 Or Better)
3 Harness Jumper (Part #S18250-1070)
24 VDC Power Supply
Wiring Diagram

GAS SOLENOID TEST *(continued)*

Figure F.17 – Gas solenoid location



PROCEDURE

1. Remove the input power to the Aspect 375 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Capacitor Discharge Procedure***.
4. Perform the ***Pre-Test Procedure***.
5. Install the 3 harness jumper part #S18250-1070 so the top section can be in the up position and functional for trouble shooting. See Figure F.17. Connect the harness to plugs JIP4, JIP3 and JIP8 on the input power board. See ***Figure F.18***.
6. Locate the gas solenoid. See Figure F.17.

⚠ CAUTION

This area of the welder has a small fan blowing across the boards for cooling.

7. Carefully apply the correct input power to the welder.
8. Turn the machine ON.
9. Energize the output of the welder in the Tig mode by pressing a foot pedal connected to the welder or run a insulated jumper across pins E and D in the 6 pin remote amphenol (lower front of welder). See ***Figure F.19***. See Wiring Diagram.
10. Using a digital volt/ohmmeter, check for 24 VDC at gas solenoid terminals 410 to 411. See Figure F.17 and ***Figure F.20***. See Wiring Diagram.
11. If the voltages are not present, disconnect the wiring to the terminals of the solenoid. See ***Figure F.20***. See Wiring Diagram.
12. Using a volt/ohmmeter, measure the resistance of the gas solenoid at the terminals. See ***Figure F.20***. The resistance should be approximately 80 ohms. See ***Table F.6***.
13. Connect the gas solenoid leads to the proper terminals. See ***Figure F.20***. See Wiring Diagram.
14. Using a digital volt/ohmmeter, measure the resistance from the metal gas solenoid body case to the gas solenoid terminals. See ***Figure F.20***. The resistance should be in the Meg ohms (+500k) range.
15. Using a 24 VDC power supply, bench test the gas solenoid. The solenoid should pull in and stay energized for an extended period of time (three minutes). Sometimes the solenoid checks good resistance but can break down while energized.
16. If the solenoid checks OK and the voltages from the input control board are not present to drive the gas solenoid, the input control board may be faulty.
17. If input control board is faulty, perform the ***Input Control Board Test***.
18. If the gas solenoid is faulty, perform the ***Gas Solenoid Removal And Replacement Procedure***.
19. Connect any previously disconnected leads to the gas solenoid.
20. Perform the ***Case Cover Replacement Procedure***.

GAS SOLENOID TEST *(continued)*

Figure F.18 – 3 harness jumper connection points

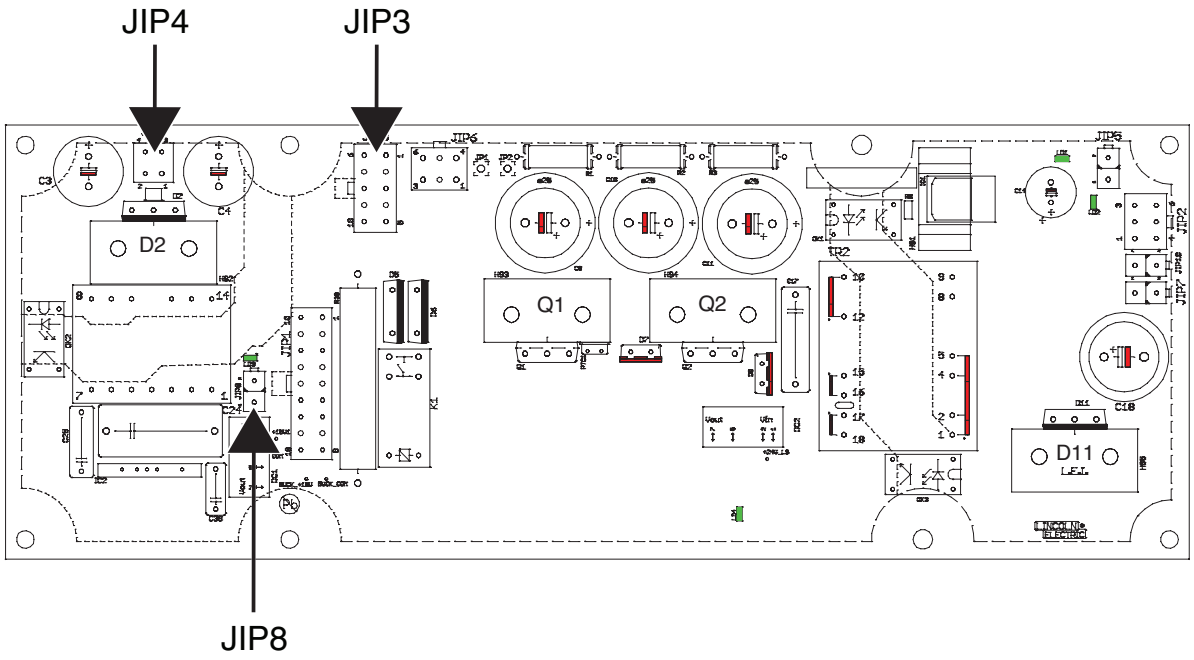


Table F.6 – Gas solenoid tests

SOLENOID RESISTANCE TEST	63 TO 88 OHMS
SOLENOID VOLTS ENERGIZED TEST	22 TO 25 VDC

GAS SOLENOID TEST *(continued)*

Figure F.19 – 6 Pin remote amphenol location and pins

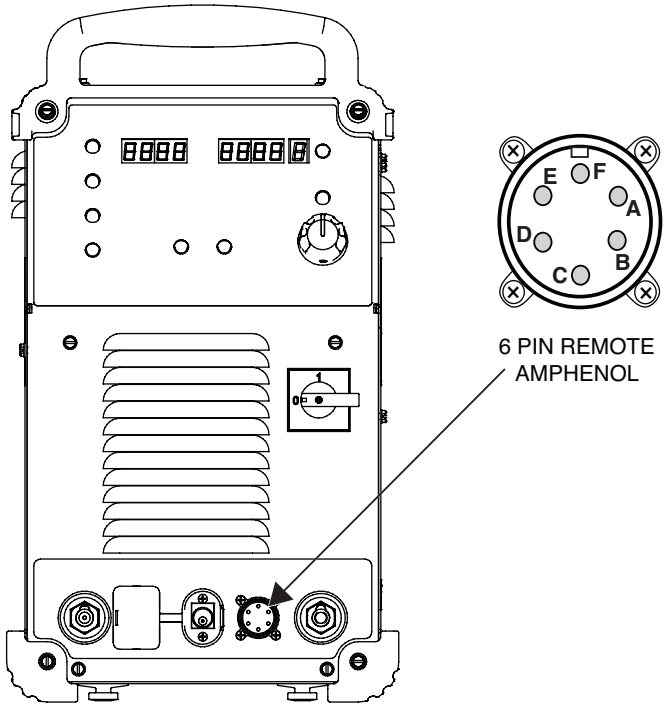
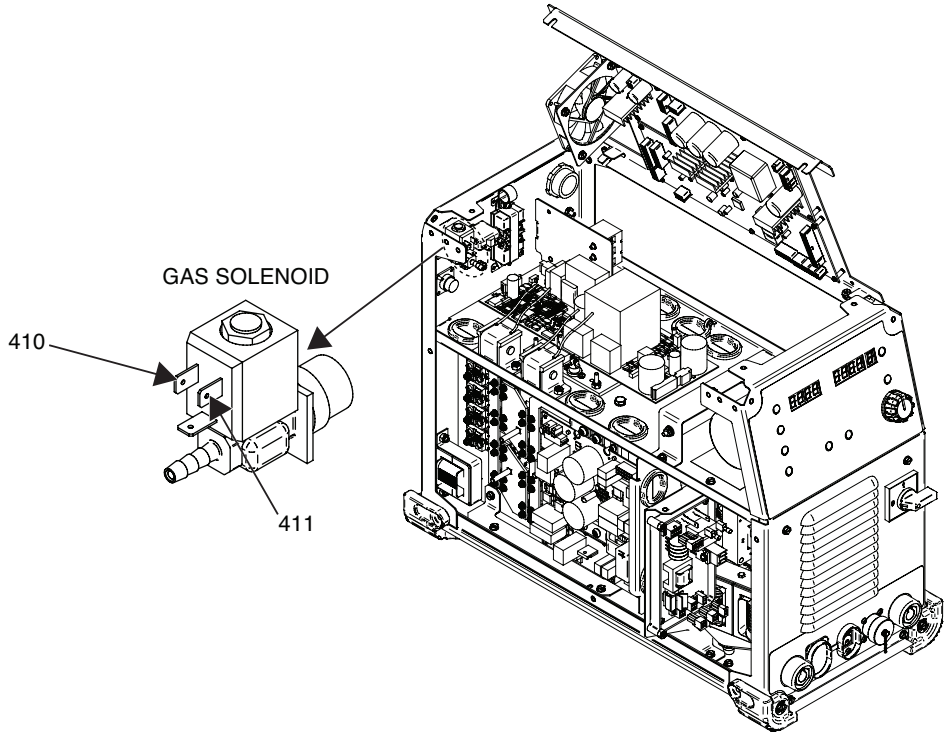


Figure F.20 – Gas solenoid lead locations



OUTPUT BOARD TEST

⚠ WARNING

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

TEST DESCRIPTION

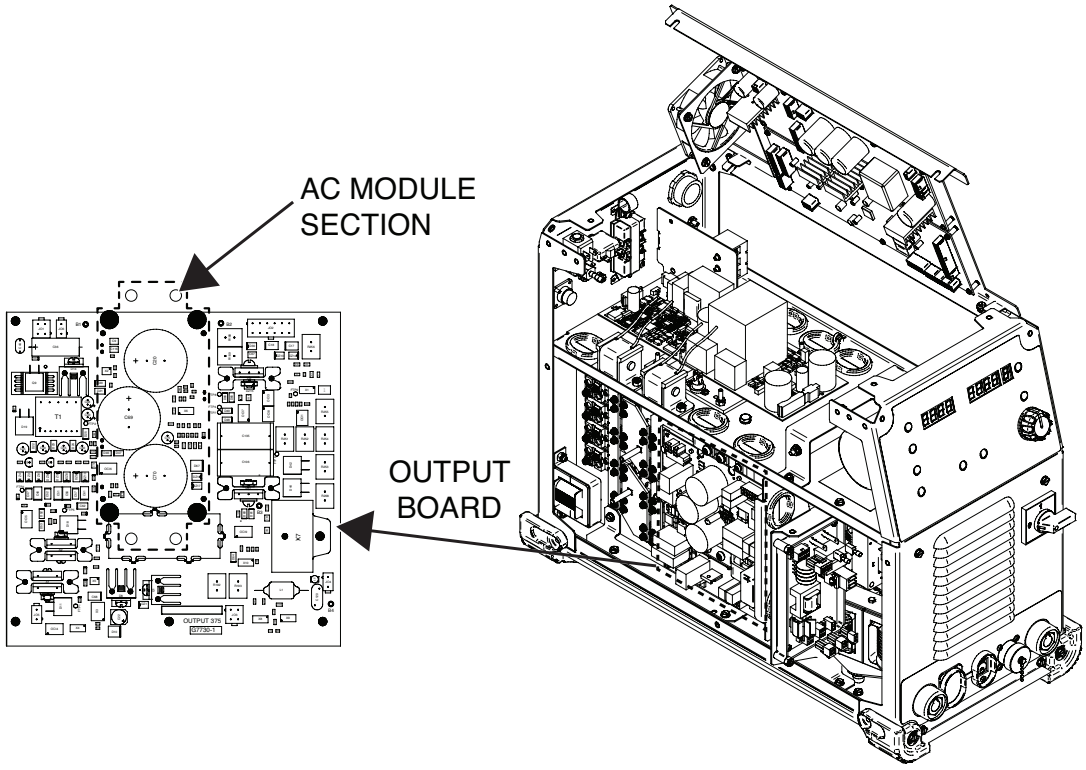
This tests will help to determine if the Output Board and AC Module are functioning.

MATERIALS NEEDED

Digital Volt/Ohmmeter (Fluke 87 Or Better)
Small Encapsulation Piercing Meter Tips
Load Bank With Stick and Tig Welding Ability
Wiring Diagram

OUTPUT BOARD TEST *(continued)*

Figure F.21 – Output board and AC module location



PROCEDURE

⚠ CAUTION

The input power will be ON and connected to the welder. The welder will need to be energized during some of this testing.

1. Remove the input power to the Aspect 375 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Capacitor Discharge Procedure***.
4. Perform the ***Pre-Test Procedure***.
5. Locate the output board. See Figure F.21.
6. Visually inspect the output board. If there is any physical damage, burnt or exploded components on this board, perform the ***Output Board Removal And Replacement Procedure***. No further testing is necessary.
7. Perform the ***Output Diode Module Test***, ***Discharge Resistor Module Test***, ***Voltage Doubler Rectifier Module Test*** and ***High Frequency & Output Bypass Circuit Board Test*** (output snubber section only).
8. Carefully apply the correct input power to the Aspect 375 machine.
9. Turn the machine ON.
10. Observe that the LEDs are illuminated. See ***Figure F.22***. These LEDs indicate the output board power supplies are working. See ***Table F.7***.
11. Using a digital volt/ohmmeter with sharp encapsulation piercing meter tips, perform the voltage tests in ***Table F.8***. See ***Figures F.23*** and ***F.24***. See Wiring Diagram.
12. Using a volt/ohmmeter with sharp encapsulation piercing meter tips, perform the resistance tests in ***Table F.9***. See ***Figures F.23*** and ***F.24***. See Wiring Diagram.
13. Using a digital volt/ohmmeter with sharp encapsulation piercing meter tips, perform the AC module forward voltage drop tests in ***Table F.10***. See ***Figure F.25***. See Wiring Diagram.
14. Using a digital volt/ohmmeter with sharp encapsulation piercing meter tips, perform AC module resistance tests in ***Table F.11***. See ***Figure F.25***. See Wiring Diagram.
15. Connect any previously removed plugs or leads. See Wiring Diagram.
16. If any of the tests fail, the output board may be faulty.
17. If faulty, perform the ***Output Board Removal And Replacement Procedure***.
18. Perform the ***Case Cover Replacement Procedure***.

OUTPUT BOARD TEST *(continued)*

Figure F.22 – Output board LED locations

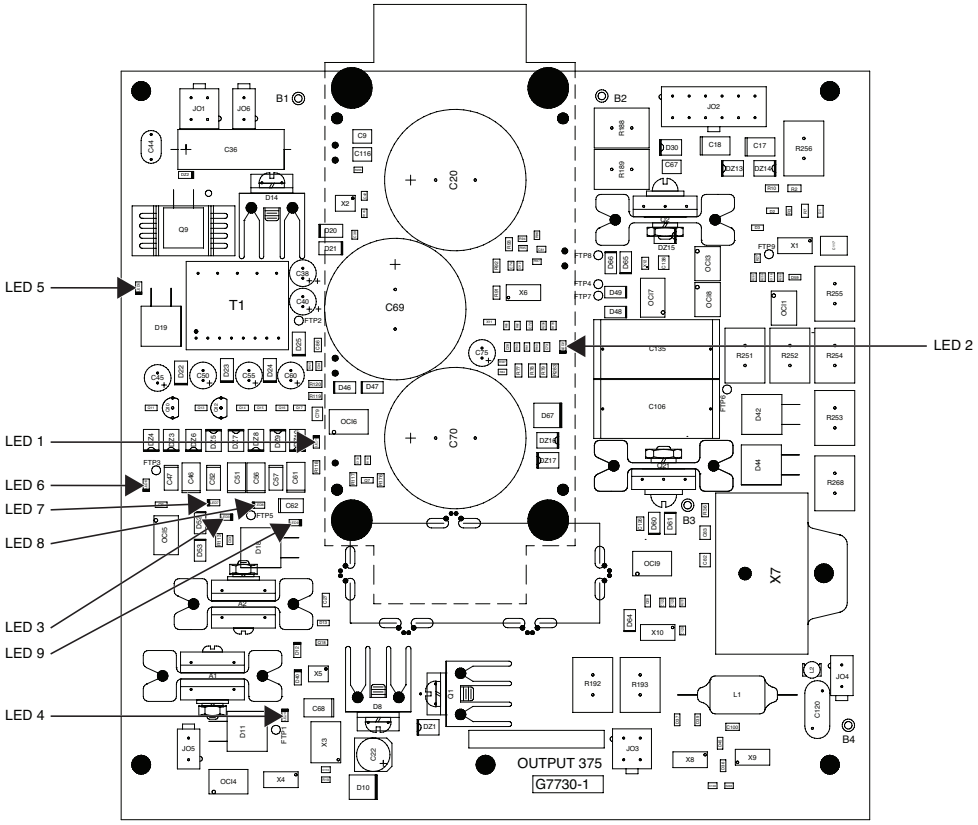


Table F.7 – Output board LED descriptions

LED 1 (RED)	POSITIVE GATE DRIVE FOR THE AC MODULE (DIMS ON AC, ON, (BRIGHT) FOR DC POSITIVE)	
LED 2 (RED)	NEGATIVE GATE DRIVE FOR THE AC MODULE (DIMS ON AC, ON (BRIGHT) FOR DC NEGATIVE)	
LED 3 (RED)	BACKGROUND GATE DRIVE. POSITIVE.	
LED 4 (RED)	BACKGROUND GATE DRIVE. NEGATIVE. (DIMS IN AC)	
LED 5 (RED)	+15 VDC PRESENT (FOR AC SWITCH & BACKGROUND DRIVES). ON	GENERATED FROM TWO 75 VDC INPUTS FROM THE INPUT POWER BOARD.
LED 6 (GREEN)	+15 VDC PRESENT FOR POSITIVE AC SWITCH GATE POWER. ON	
LED 7 (GREEN)	+15 VDC PRESENT FOR NEGATIVE AC SWITCH GATE POWER. ON	
LED 8 (GREEN)	BACKGROUND POSITIVE +15 VDC GATE SUPPLY PRESENT. ON	
LED 9 (GREEN)	BACKGROUND NEGATIVE +15 VDC GATE SUPPLY PRESENT. ON	

OUTPUT BOARD TEST *(continued)*

Figure F.23 – Output board plug locations

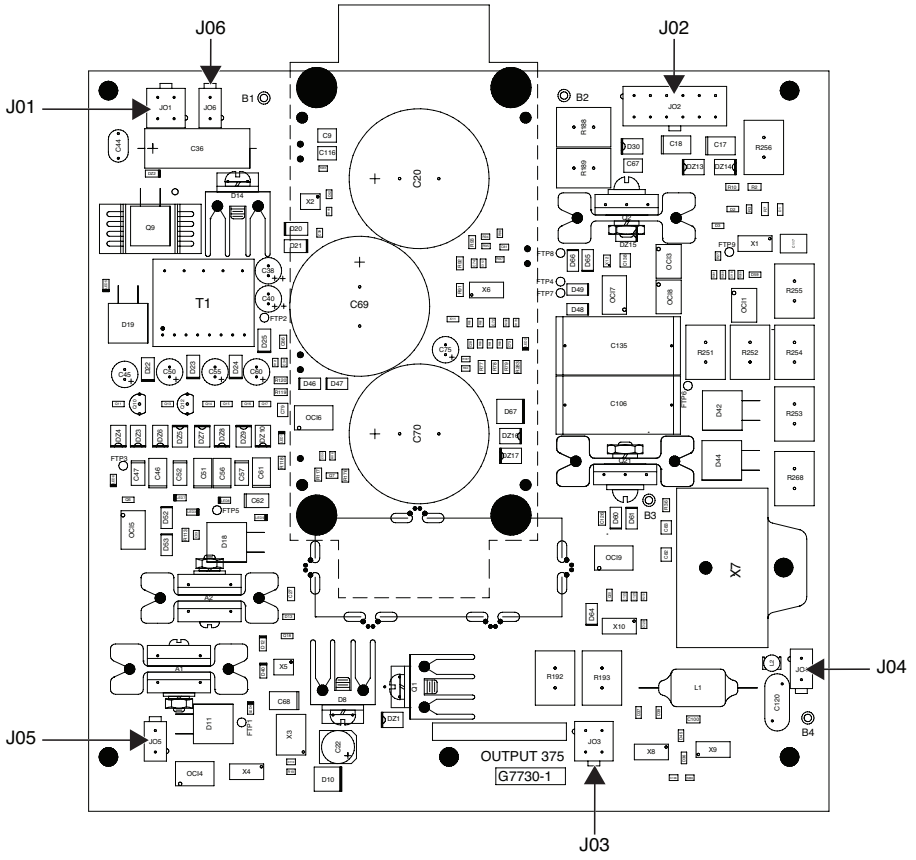


Table F.8 – Output board voltage tests

PLUG	TEST POINT	TEST POINT	EXPECTED READING	MACHINE CONDITION
J01	PIN 1 (LEAD 224+)	PIN 2 (LEAD 225-)	75 VDC	MACHINE SET TO AC STICK MODE.
J01	PIN 3 (LEAD 226+)	PIN 4 (LEAD 227-)	75 VDC	MACHINE SET TO AC STICK MODE.
J03	PIN 1 (LEAD X9)	PIN 4 (LEAD X10)	270 VDC	MACHINE SET TO AC STICK MODE.
J04	PIN 1 (LEAD 206)	PIN 2 (LEAD 201)	16 VAC	VOLTAGE SHOULD BE THE SAME AS AT THE OUTPUT TERMINALS.
J02	PIN 9 (LEAD 220+)	PIN 5 (LEAD 217-)	LESS THAN 1 VDC	OUTPUT ON.
J02	PIN 9 (LEAD 220+)	PIN 5 (LEAD 217-)	15 VDC	OUTPUT OFF.
J02	PIN 12 (LEAD 223+)	PIN 5 (LEAD 217-)	.01 VDC	OUTPUT ON.
J02	PIN 12 (LEAD 223+)	PIN 5 (LEAD 217-)	15 VDC	OUTPUT OFF.

Table F.9 – Output board resistance tests

PLUG	TEST POINT	TEST POINT	EXPECTED READING	MACHINE CONDITION
J05	PIN 1	PIN 2	VERY LOW Ω	PLUG J05 DISCONNECTED FROM BOARD. TEST AT PLUG.
J06	PIN 1	PIN 2	99 Ω	PLUG J06 DISCONNECTED FROM BOARD. TEST AT PLUG.

OUTPUT BOARD TEST *(continued)*

Figure F.24 – Output board pin and lead locations

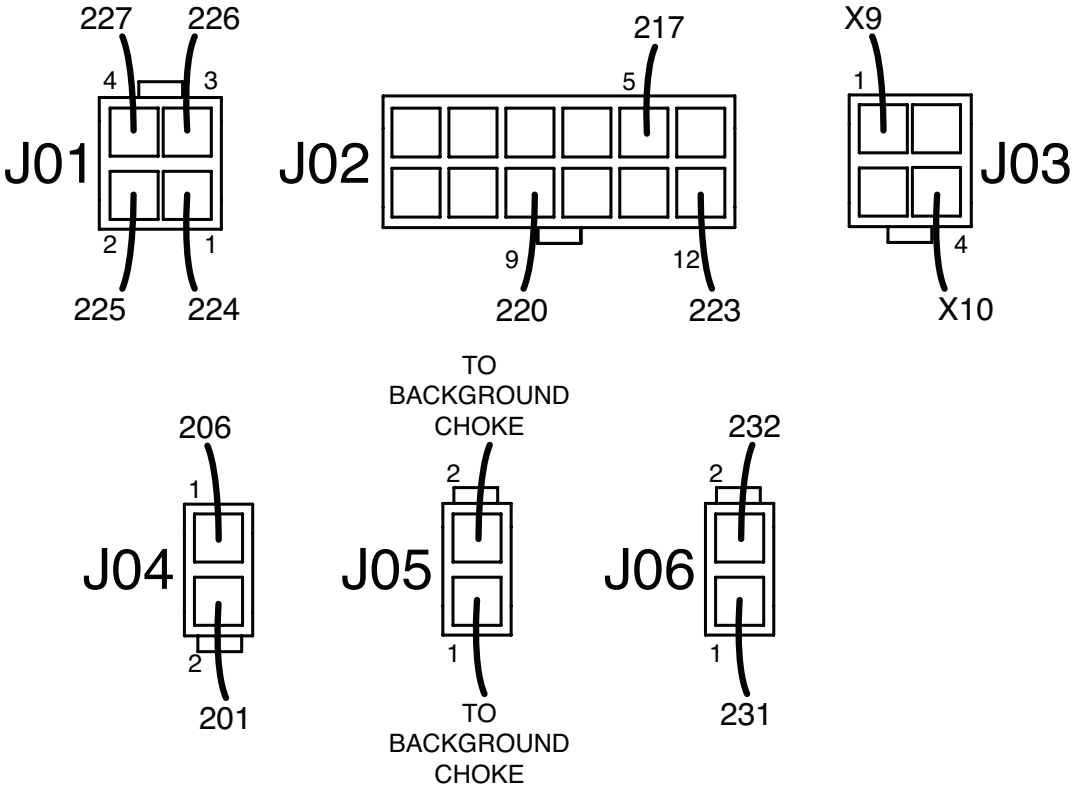


Table F.10 – AC module forward voltage drop tests

MODULE PIN TEST POINTS	TYPE OF READING	FORWARD VOLTAGE DROP	+/- 20% ERROR RANGE
PIN 8(+) TO PIN 4(-)	DIODE FORWARD DROP	.327 VDC	.262 TO .393
PIN 2(+) TO PIN 11(-)	DIODE FORWARD DROP	.327 VDC	.262 TO .393

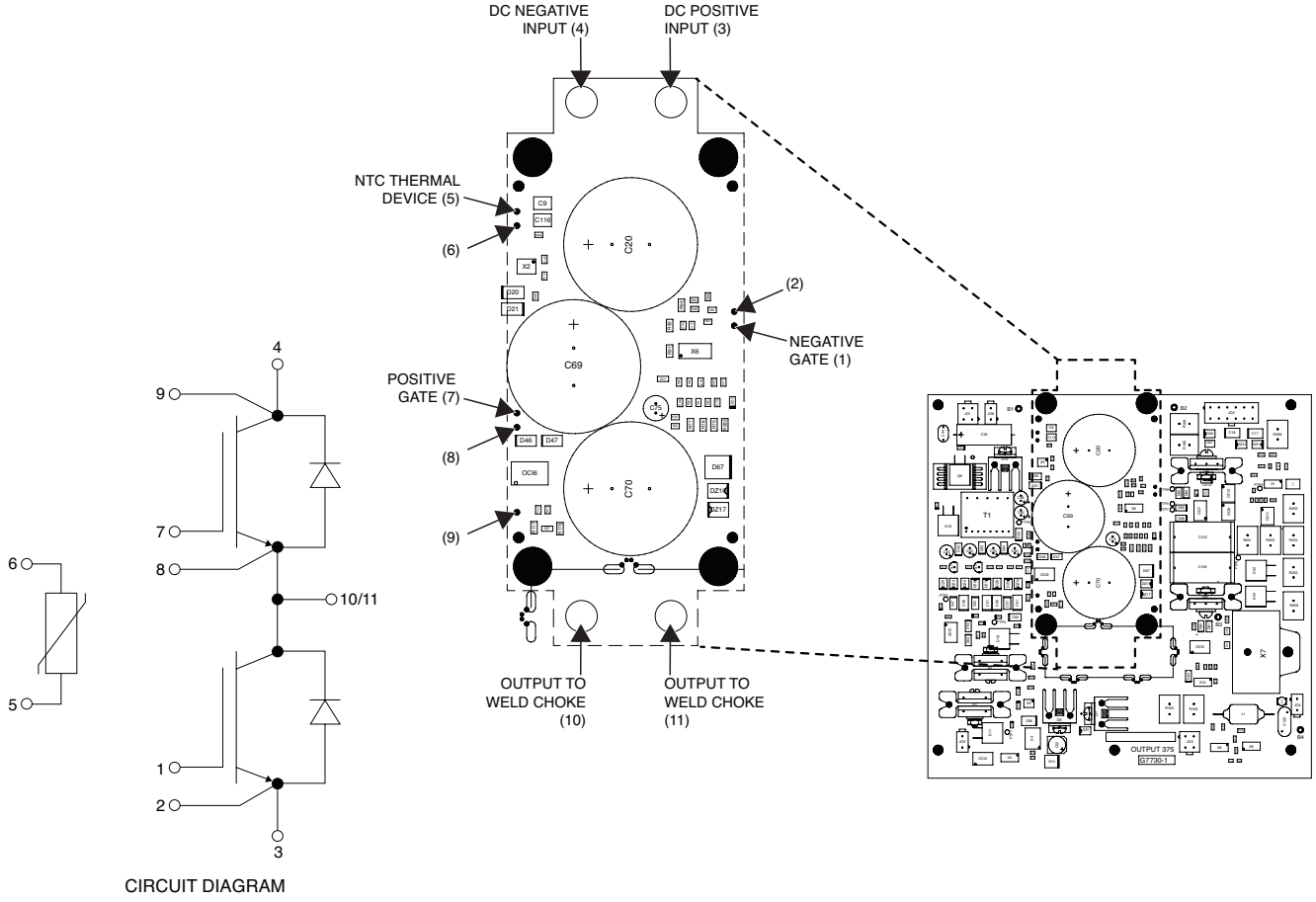
Meter probe polarity = positive to negative.

Table F.11 – AC module resistance tests

MODULE PIN TEST POINTS	TYPE OF READING	FORWARD VOLTAGE DROP	
PIN 5 TO PIN 6	NTC = AT 70ºF	2.6K OHMS, NOTE: 500 OHMS +/- 10%	
PIN 7(+) TO PIN 4(-)	POS. GATE LEAD (COLLECTOR)	4.2k OHMS +/- 15%	RANGE: 4.8K TO 3.6K
PIN 4(+) TO PIN 7(-)	POS. GATE LEAD (COLLECTOR)	5.5k OHMS +/- 15%	6.3k TO 5.35k
PIN 7(+) TO PIN 11(-)	POS. GATE LEAD (EMITTER)	3.2K OHMS +/- 15%	3.7k TO 5.35k
PIN 11(+) TO PIN 7(-)	POS. GATE LEAD (EMITTER)	2.0k OHMS +/- 15%	2.3k TO 1.7k
PIN 1(+) TO PIN 2(-)	NEG. GATE LEAD (EMITTER)	4.48k OHMS +/- 15%	5.2K TO 3.7K
PIN 2(+) TO PIN 1(-)	NEG. GATE LEAD (EMITTER)	2.63k OHMS +/- 15%	3.0k TO 2.35k
PIN 1(+) TO PIN 11(-)	NEG. GATE LEAD (COLLECTOR)	5.6K OHMS +/- 15%	6.5k TO 4.5k
PIN 11(+) TO PIN 1(-)	NEG. GATE LEAD (COLLECTOR)	6.4k OHMS +/- 15%	7.4k TO 5.4k

OUTPUT BOARD TEST *(continued)*

Figure F.25 – AC module test point locations



CURRENT TRANSDUCER TEST (ON THE OUTPUT BOARD)

⚠ WARNING

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

TEST DESCRIPTION

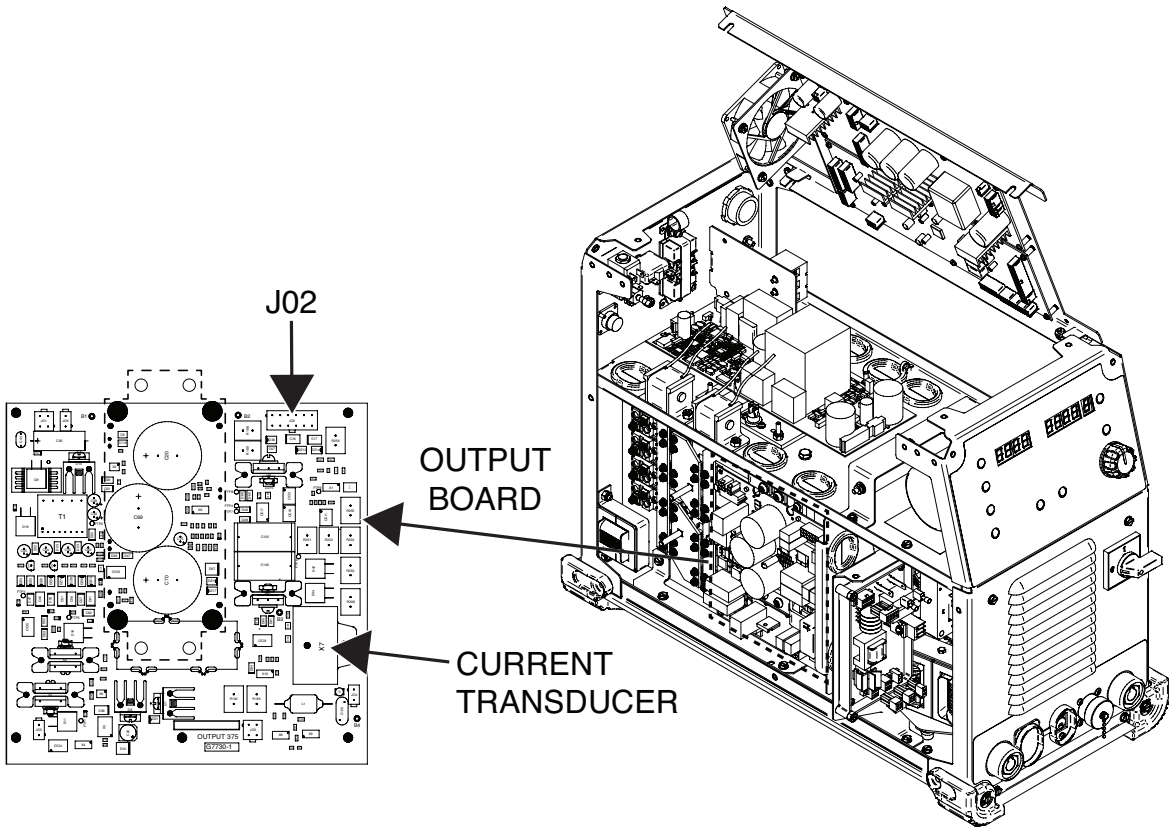
This test will help determine if the Output Board Current Transducer is functioning correctly.

MATERIALS NEEDED

Digital Volt/Ohmmeter (Fluke 87 Or Better)
Small Encapsulation Piercing Meter Tips
Load Bank
Wiring Diagram

CURRENT TRANSDUCER TEST (ON THE OUTPUT BOARD) *(continued)*

Figure F.26 – Output board, current transducer and plug J02 locations



PROCEDURE

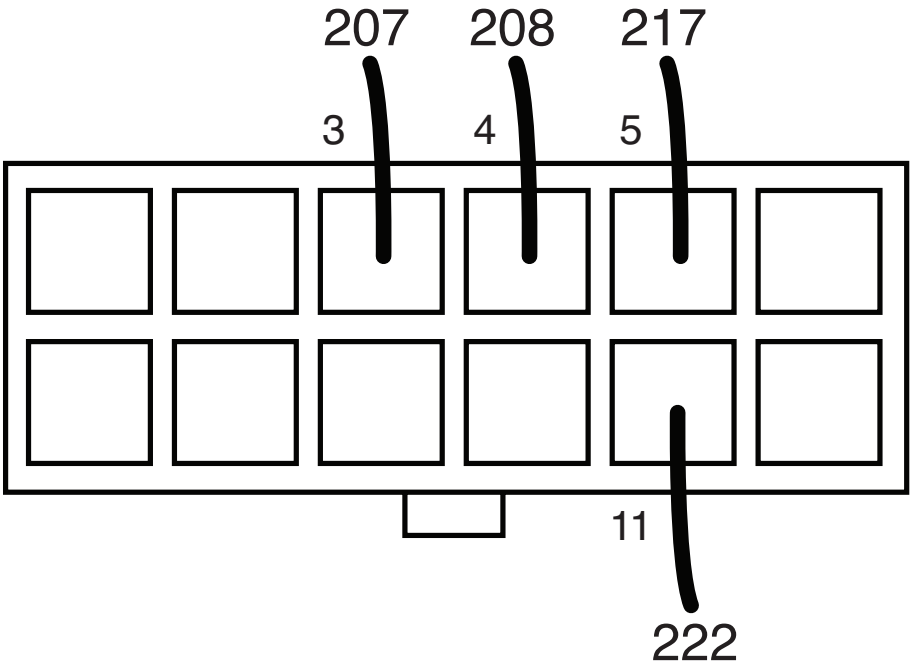
1. Remove the input power to the Aspect 375 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Capacitor Discharge Procedure***.
4. Perform the ***Pre-Test Procedure***.
5. Locate the output board. See Figure F.26.
6. Locate plug J02 on the output board. See Figure F.26. See Wiring Diagram.

NOTE: Use test meter probes on the lead side of the molex for measurements to avoid molex pin damage.

7. Carefully connect a resistive load bank to the output studs of the welder.
8. Apply the correct input voltage to the machine.
9. Turn the machine ON.
10. After the welder initializes, set the welder in the DC Stick Mode. Welder output will energize automatically in the stick mode (no remote attached).
11. Load the welder to 150 amps at 15 to 20 volts (adjusting the welder output control and load bank).
12. Using a digital volt/ohmmeter, check the current transducer feedback on plug J02 (on the output board) from pin 4 to pin 5 (leads 208 to 217). The reading should be around 1.65 to 2.1 VDC. See ***Figure F.27***. See Wiring Diagram.
13. If the voltage is not present, the +15 and -15 volt supplies will have to be checked at the same output board connector.
14. Using a digital volt/ohmmeter, check for +15 VDC on plug J02 at pin 11(+) to pin 5(-) (leads 222 to 217). See ***Figure F.27***. See Wiring Diagram.
15. Using a digital volt/ohmmeter, check for -15 VDC on plug J02 at pin 3 to pin 5 (leads 207 to 217). See ***Figure F.27***. See Wiring Diagram.
16. Using a digital volt/ohmmeter, check for 30 VDC on plug J02 from pin 11 to pin 3 (leads 222 to 207). See ***Figure F.27***. See Wiring Diagram.
17. If this +30 VDC supply is present and there is not 1.65 to 2.1 VDC feedback when the welder is load banked, then the LEM current transducer may be faulty. If faulty, perform the ***Output Board Removal And Replacement Procedure***.
18. If the +15, -15 or +30 VDC is not present, perform the ***Input Power Board Test***. The input power board feeds the input control board, these power supplies are for use on the output board.
19. If the any of the tests fail, the board may be faulty.
20. If faulty, perform the ***Output Board Removal And Replacement Procedure***.
21. Perform the ***Case Cover Replacement Procedure***.

CURRENT TRANSDUCER TEST (ON THE OUTPUT BOARD) *(continued)*

Figure F.27 – Plug J02 pin and lead locations



BUCK/BOOST BOARD & IGBT TEST

⚠ WARNING

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

TEST DESCRIPTION

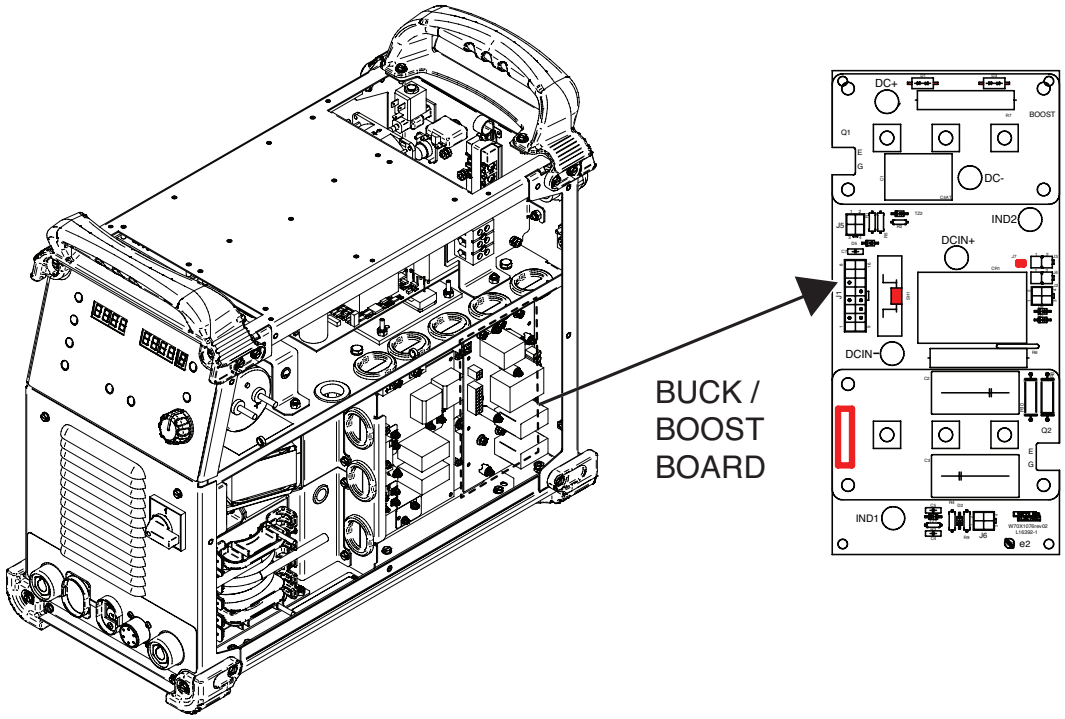
This test will help determine if the Buck/Boost Board and its IGBT's are functioning properly.

MATERIALS NEEDED

Digital Volt/Ohmmeter (Fluke 87 Or Better)
Wiring Diagram

BUCK/BOOST BOARD & IGBT TEST *(continued)*

Figure F.28 – Buck/boost board location



PROCEDURE

1. Remove the input power to the Aspect 375 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Capacitor Discharge Procedure***.
4. Perform the ***Pre-Test Procedure***.
5. Locate the buck/boost board. See Figure F.28.
6. Do a visual inspection of the board. Look for any damaged, burnt, exploded electrical components or board damage.
7. Using a digital volt/ohmmeter (set to diode test mode), perform the forward voltage drop tests for each of the four module sections. See ***Table F.12***. See ***Figure F.29*** and ***F.30***.
8. If the forward voltage drop of the internal diode indicates out of spec (open or shorted), both modules and buck/boost board may be faulty.
9. See the ***Input Control Board Test*** for the LED pattern gate drive for this board. If the LED pattern is correct and there is not 400 VDC generated on the C1 capacitor, then the buck/boost board is faulty.
10. Carefully apply the input power to the Aspect 375 machine.
11. A relay on this board should emit an audible click. See ***Figure F.29***.
12. Using a digital volt/ohmmeter set for DC volts, test for +400 VDC at DC+ and DC- test points on the buck/boost board. See ***Figure F.30***. See Wiring Diagram.
13. Using a digital volt/ohmmeter set for DC volts, test for typical rectified 3 phase input and the DC+ and DC- test points. See ***Table F.13***. See ***Figure F.30***. See Wiring Diagram.
14. Using a digital volt/ohmmeter, test for typical frequency and voltage readings at terminals IND1 and IND2 on the buck/boost board. See ***Table F.14***. See ***Figure F.30***.

NOTE: These readings will vary depending on input voltage.

15. If any of the tests fail, the buck/boost board may be faulty.
16. If faulty, perform the ***Buck/Boost Board Removal And Replacement Procedure***.
17. Perform the ***Case Cover Replacement Procedure***.

BUCK/BOOST BOARD & IGBT TEST *(continued)*

Figure F.29 – Forward voltage drop test points

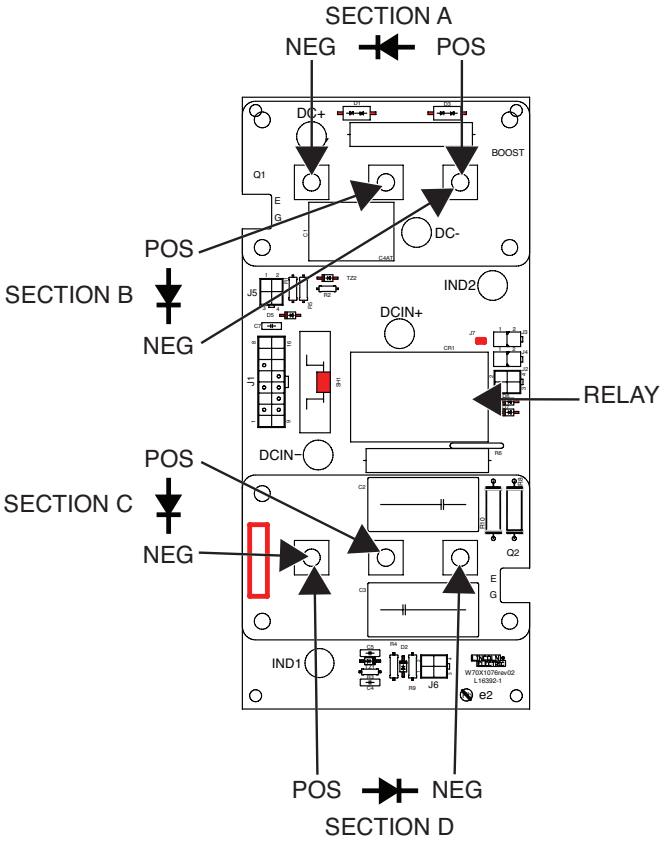


Table F.12 – Forward voltage drop tests

SECTION TO BE MEASURED	TEST POINTS SEE FIGURE F.29	EXPECTED READING	+/- 10% TOLERANCE
SECTION A	POS → NEG	.355 VDC +/- 10%	.320 TO .391
SECTION B	POS → NEG	.305 VDC +/- 10%	.275 TO .336
SECTION C	POS → NEG	.305 VDC +/- 10%	.275 TO .336
SECTION D	POS → NEG	.408 VDC +/- 10%	.367 TO .449

BUCK/BOOST BOARD & IGBT TEST *(continued)*

Figure F.30 – DC voltage test points

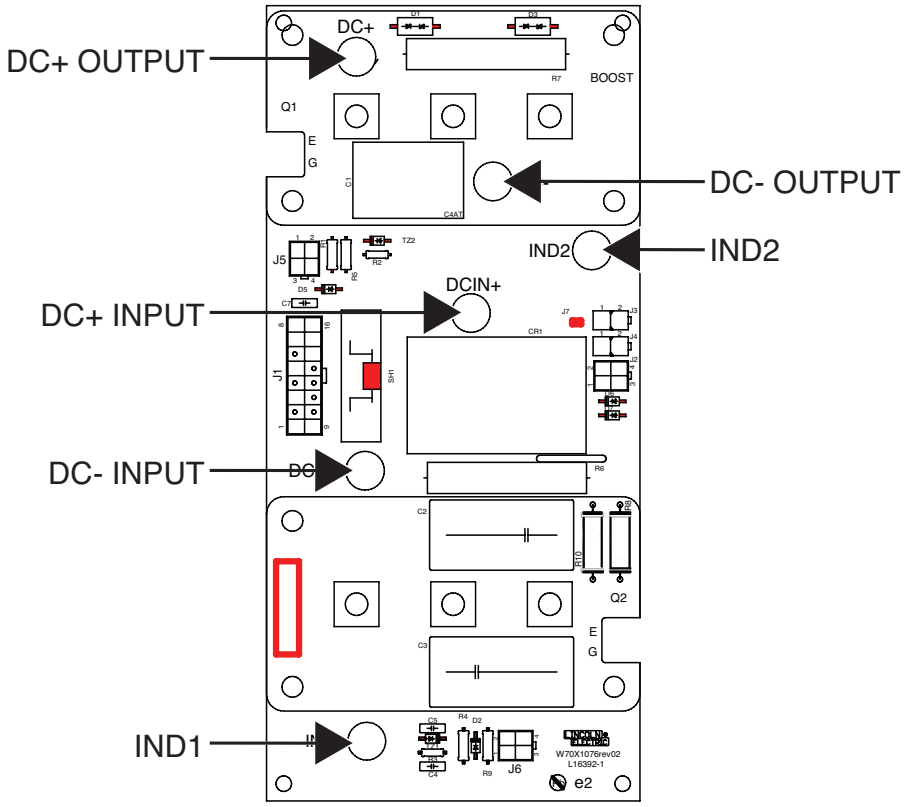


Table F.13 – Typical rectified 3 phase input

AC INPUT	DC
208 VAC	294 VDC
230 VAC	325 VDC
460 VAC	650 VDC
575 VAC	813 VDC
600 VAC	848 VDC

Table F.14 – Typical frequency and voltage readings

TEST POINT	TEST POINT	EXPECTED FREQUENCY READINGS	EXPECTED VOLTAGE READINGS	MACHINE CONDITION
IND1	IND2	150 TO 183 KHZ	256 VDC	460 V INPUT TO MACHINE. OCV (NO LOAD).
IND1	IND2	25 KHZ	250 TO 350 VDC	MACHINE LOADED AT 175 AMPS / 23 V.

BUCK & BOOST PTC THERMISTORS TEST

⚠ WARNING

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

TEST DESCRIPTION

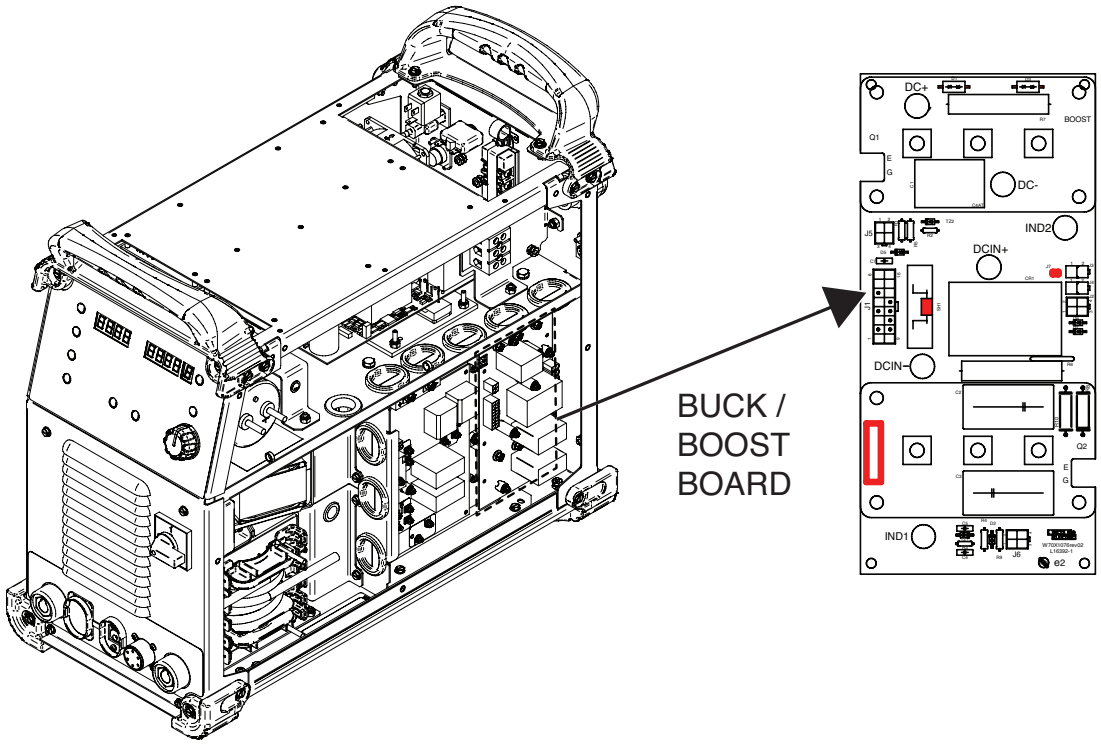
This test will help determine if the Buck & Boost PTC thermistors are defective. PTC = Positive Temperature Coefficient thermal device.

MATERIALS NEEDED

Digital Volt/Ohmmeter (Fluke 87 Or Better)
Small Encapsulation Piercing Meter Tips
Wiring Diagram

BUCK & BOOST PTC THERMISTORS TEST *(continued)*

Figure F.31 – Buck/boost board location



PROCEDURE

1. Remove the input power to the Aspect 375 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Capacitor Discharge Procedure***.
4. Locate the buck/boost board. See Figure F.31.
5. Label and disconnect plug J3 from the buck/boost board. See ***Figure F.32***. See Wiring Diagram.
6. Using a digital volt/ohmmeter, measure the resistance on the lead side of the plug J3. See ***Table F.15***, for test points and expected readings.

NOTE: Probing on the terminal with the meter probes will damage the terminal.

7. Observe the resistance at temperature. See ***Table F.15***. If the resistance is out of spec, the device may be faulty.
8. Connect plug J3 to the buck/boost board. See ***Figure F.32***. See Wiring Diagram.
9. Label and disconnect plug J4 from the buck/boost board. See ***Figure F.32***. See Wiring Diagram.
10. Using a digital volt/ohmmeter, measure the resistance on the lead side of the plug J4. See ***Table F.15***, for test points and expected readings.

NOTE: Probing on the terminal with the meter probes will damage the terminal.

11. Observe the resistance at temperature. See ***Table F.15***. If the resistance is out of spec then the device may be faulty.
12. Connect plug J4 to the buck/boost board. See ***Figure F.32***. See Wiring Diagram.
13. If faulty, perform the ***Buck & Boost PTC Thermistor Removal And Replacement Procedure***.
14. Perform the ***Case Cover Replacement Procedure***.

BUCK & BOOST PTC THERMISTORS TEST *(continued)*

Figure F.32 – Plug J3 and J4 locations

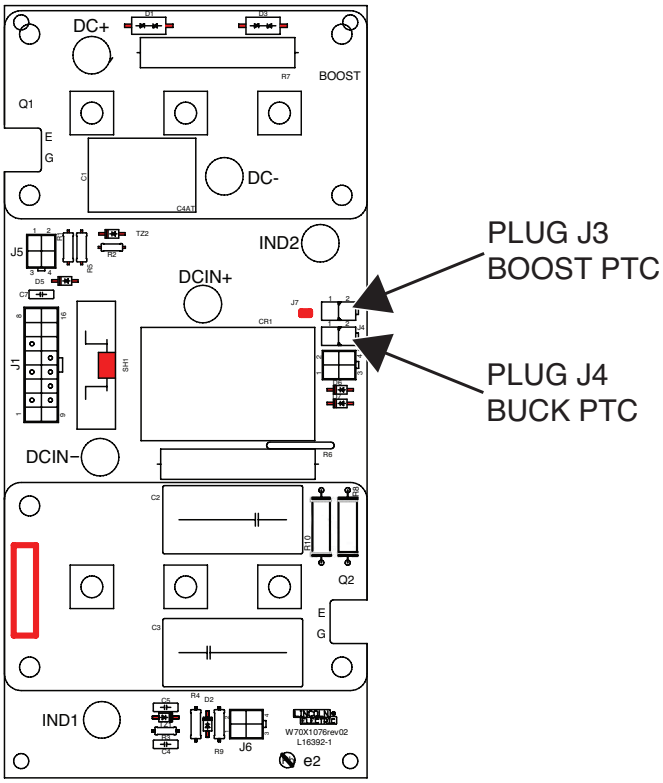


Table F.15 – Resistance tests

TEMPERATURE	RESISTANCE (CAN BE +/- 10% OF STATED VALUES)
77ºF TO 140ºF	100 TO 250 OHMS MAX (TYPICALLY AT 50 TO 60 OHMS)
185ºF	1330 OHMS MINIMUM
203ºF	4000 OHMS MINIMUM

INVERTER BOARD TEST

⚠ WARNING

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

TEST DESCRIPTION

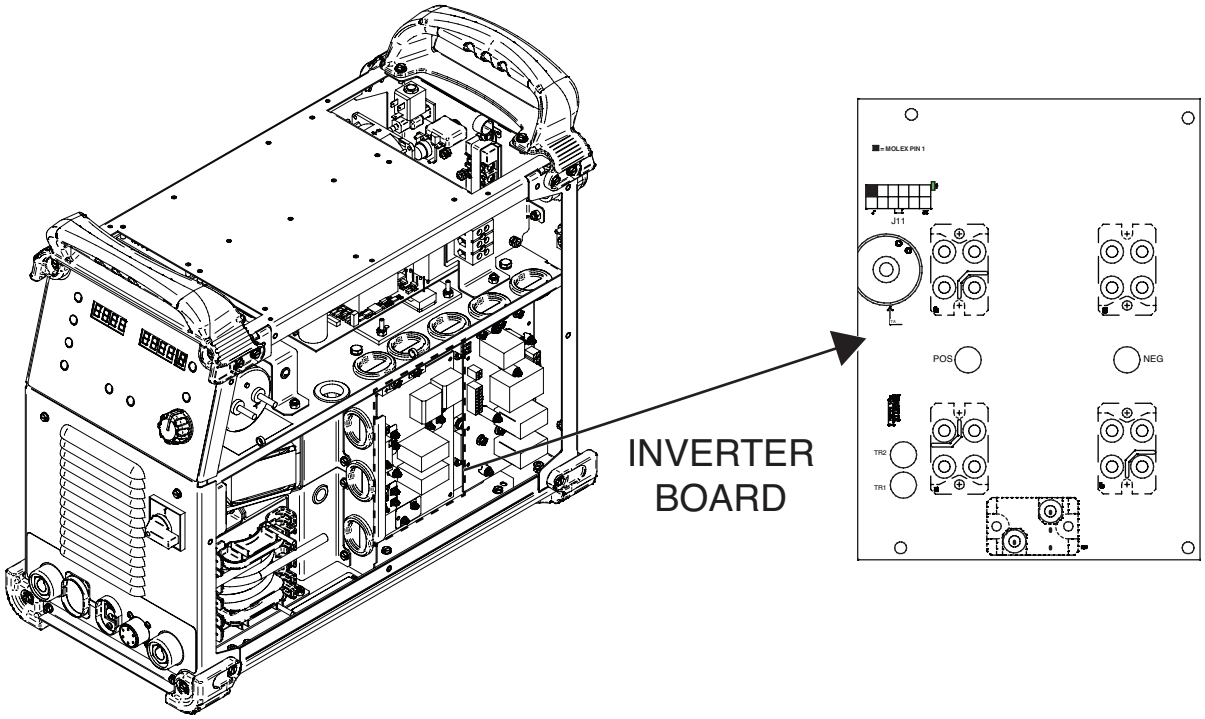
This test will help determine if the Inverter Board and its IGBT Modules are defective.

MATERIALS NEEDED

Digital Volt/Ohmmeter (Fluke 87 Or Better)
Wiring Diagram

INVERTER BOARD TEST *(continued)*

Figure F.33 – Inverter board location



PROCEDURE

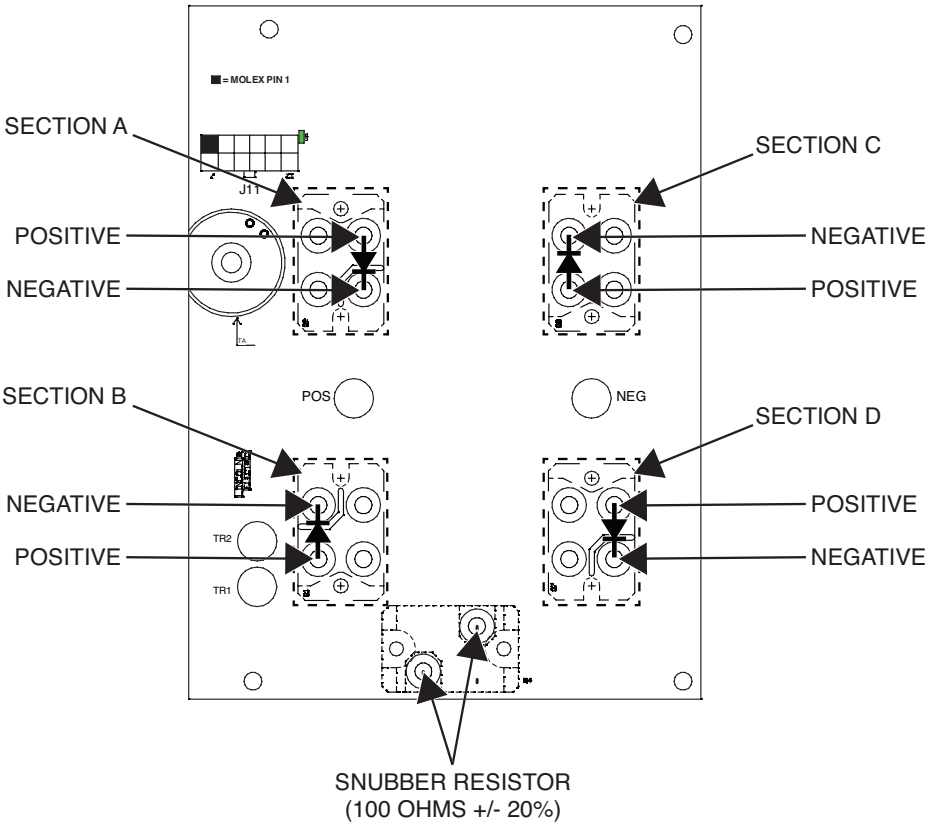
1. Remove the input power to the Aspect 375 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Capacitor Discharge Procedure***.
4. Perform the ***Pre-Test Procedure***.
5. Locate the inverter board. See Figure F.33.
6. Do a visual inspection of the board. Look for any damaged, burnt or exploded electrical components or board damage.
7. Using a digital volt/ohmmeter set to diode test mode, perform the forward voltage drop tests on the internal diode of the IGBT modules. See ***Figure F.34***. See ***Table F.16***.
8. If the forward voltage drop of the modules internal diode is out of spec (open or shorted), the module may be faulty.
9. Perform the ***Inverter Board Removal Procedure*** and retest the module again to verify that the module is faulty.
10. If the module tests OK, then the inverter board may be faulty.

SNUBBER RESISTOR MODULE TEST SECTION

11. Using a digital volt/ohmmeter (set to resistance mode), measure the resistance of the inverter board snubber resistor module. See ***Figure F.34***. Resistance should be 100 ohms +/- 20% tolerance (80 to 120 ohms).
12. If the module is out of spec (open or shorted), perform the ***Inverter Board Removal Procedure*** and retest the resistor module to verify that the module is faulty.
13. If the module tests OK, then the inverter board may be faulty.

INVERTER BOARD TEST *(continued)*

Figure F.34 – module and snubber resistor test points



POWERED UP CONDITIONS

14. Make sure all the electrical connections and modules are in good condition and that the IGBT modules are in place and have tested OK.
15. Carefully apply the correct input power to the welder.
16. Turn the machine ON.
17. Using a digital volt/ohmmeter, test for 400 VDC (indicated with the correct polarity) at the positive and negative terminals of the inverter board. See ***Figure F.35***.
18. If the 400 VDC voltage is not present and there is no output from the inverter board according to ***Table F.17***. Perform the ***Input Control Board Test***.
19. If the input control board tests OK, the inverter board may be faulty.
20. If the 400 VDC voltage is not present, perform the ***Buck/Boost Board & IGBT Test*** and check the wiring between the buck boost board, 400V capacitor and the inverter board. See Wiring Diagram.
21. Verify that the green LED1 is illuminated on the inverter board. The green LED1 indicates +15VDC is present from the input control board / input power board. See ***Figure F.35***
22. Connect any leads or plugs removed during testing.
23. If any tests fail, the inverter board may be faulty.
24. If faulty, perform the ***Inverter Board Removal And Replacement Procedure***.
25. Perform the ***Case Cover Replacement Procedure***.

INVERTER BOARD TEST *(continued)*

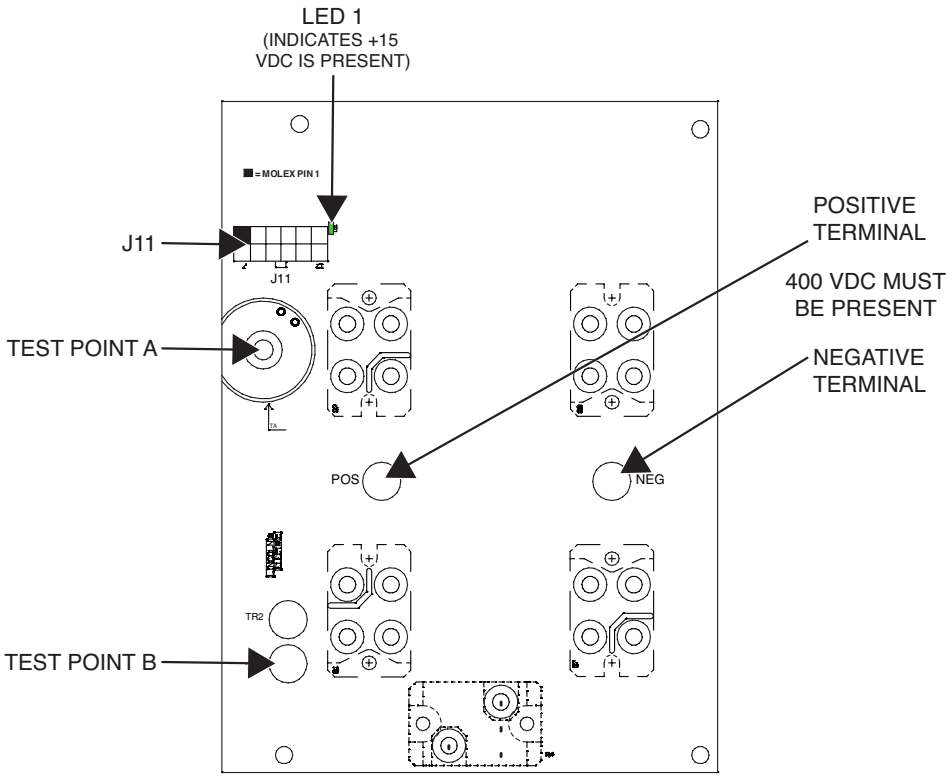
Table F.16 – Forward voltage drop tests

SECTION TO BE MEASURED	METER PROBES SEE *FIGURE F.34*	EXPECTED READING	+/- 20% VALUES
SECTION A	POS → NEG	.32 VOLTS DC +/- 20%	.256 TO .384
SECTION B	POS → NEG	.32 VOLTS DC +/- 20%	.256 TO .384
SECTION C	POS → NEG	.32 VOLTS DC +/- 20%	.256 TO .384
SECTION D	POS → NEG	.32 VOLTS DC +/- 20%	.256 TO .384

Figure F.17 – DC OPEN CIRCUIT VOLTAGE OUTPUT TEST

PLUG	TEST POINT	TEST POINT	EXPECTED READING
J11	PIN 6 (-) (LEAD 404)	PIN 12 (+) (LEAD 409)	+15 VDC
J11	PIN 6 (LEAD 404)	PIN 4 (LEAD 402)	-15 VDC
J11	PIN 6 (LEAD 404)	PIN 2 (LEAD 401)	.5 VDC

Figure F.35 – Inverter board test points



INPUT CONTROL BOARD TEST

⚠ WARNING

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

TEST DESCRIPTION

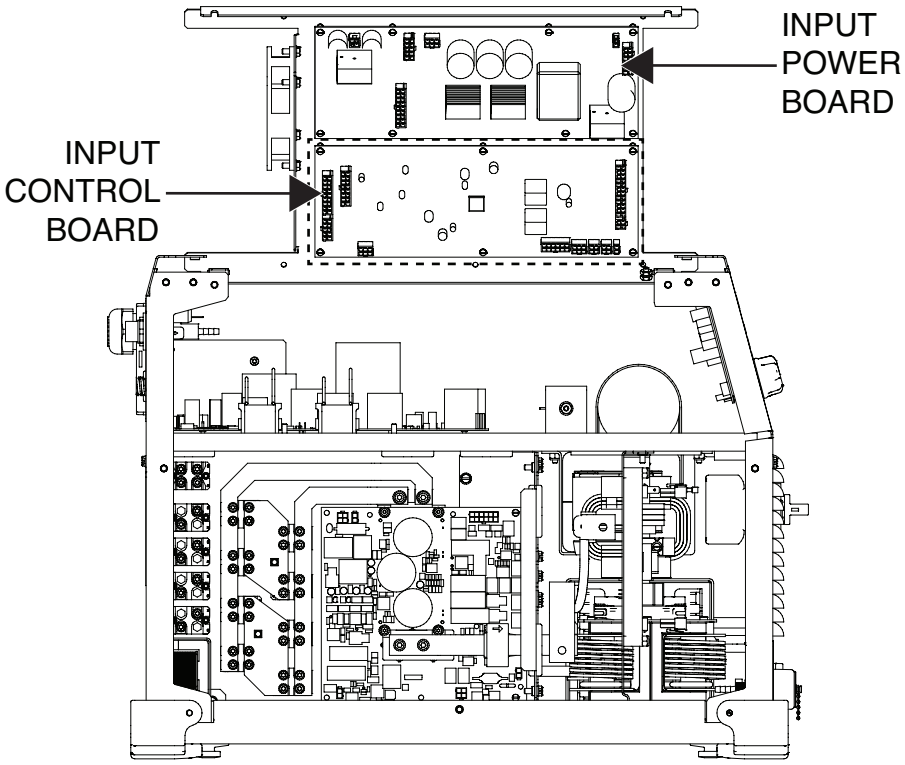
This test will help determine if the Input Control Board is functioning properly.

MATERIALS NEEDED

Digital Volt/Ohmmeter (Fluke 87 Or Better)
Non Conductive Brace
A Known Good Cool Arc 47
A Known Good Water Cooled TIG Torch Or Bypass Hose (Part #D-2218-150-1R)
3 Harness Jumper (Part #S18250-1070)
Wiring Diagram

INPUT CONTROL BOARD TEST *(continued)*

Figure F.36 – Input control board location



PROCEDURE

1. Remove the input power to the Aspect 375 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Capacitor Discharge Procedure***.
4. Perform the ***Pre-Test Procedure***.
5. Carefully maneuver the top tray into the upright position by tilting the top tray up and to the right. A non conductive brace will need to be used to hold the top tray in the upright position. See Figure F.36.
6. Locate the input control board. See Figure F.36.
7. Install the 3 harness jumper part #S18250-1070. So the top section can be in the up position and functional for trouble shooting. Connect the harness to plugs JIP4, JIP3 and JIP8 of the input power board. See Figure F.36. See ***Figure F.37***.
8. Carefully apply the correct input power to the machine.
9. Turn the machine ON.
10. Observe that the LEDs are illuminated. See ***Figure F.38***. See ***Table F.18***. The LED's indicate that some of the input control board power supplies are working and other functions of this board are functioning properly.
11. If LED 1 is NOT illuminated, the input control board may be faulty. LED 1 indicates the complex programmable logic device (CPLD) is functioning.
12. See ***Table F.18*** for the other LED functions by testing for single or three phase input power (pulling one of the input fuses can accomplish this before starting the welder). See Wiring Diagram.
13. LED 4 & 5 buck boost will vary on different rated input voltages.
14. Boost LED 4 should be illuminated during low rated input voltages condition, typically off during higher inputs, above 230 VAC.
15. Buck LED 5 should be illuminated during higher rated input voltages. Possible small flicker. ON (illuminated) 100% of the time in voltages below 230 VDC.

MAIN FAN CONTROL SECTION

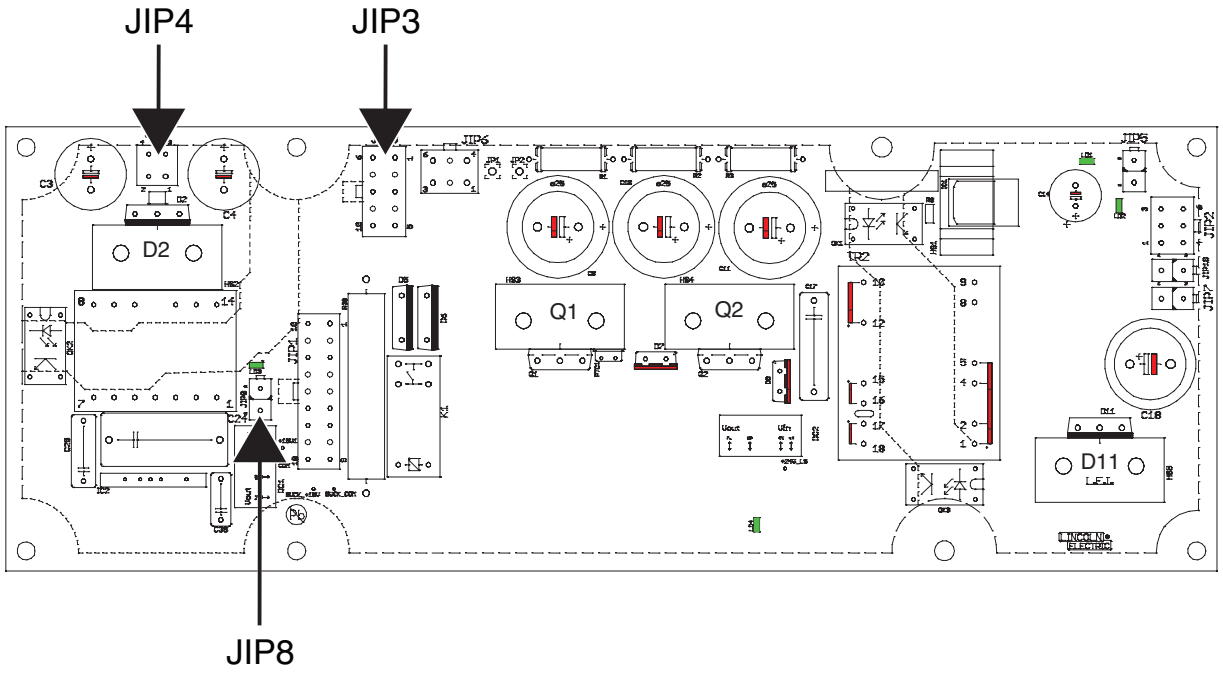
16. The input control board controls the main cooling fans from two 4 pin connectors JF2 (lower fan) and JF1 (upper fan).
17. Carefully apply the correct input power to the machine.
18. Using a digital volt/ohmmeter, perform the main fan control section voltage tests on the input control board. See ***Table F.19***. See ***Figure F.39***.

NOTE: The fans run at half speed with output ON, at idle and at OCV. The fans will go to high speed when a weld load is applied to the output.

19. If the readings are correct and the fans are not running, the fan(s) or their connectors may be faulty. See Wiring Diagram.
20. If the readings are not present, the input control board may be faulty.

INPUT CONTROL BOARD TEST *(continued)*

Figure F.37 – Input control board plug and LED locations



COOLER CONTROL SECTION

21. Carefully apply the correct input power to the machine.
22. Turn the machine ON.
23. Using a digital volt/ohmmeter, measure voltages at the cooler control section of the input control board. See ***Table F.20***. See ***Figure F.40***.
24. Connect a known good water cooled Tig torch to a known good Cool Arc 47 cooler.
25. Connect the cooler to the Aspect 375 machine. See the Wiring Diagram.
26. If the voltage readings are correct and the cooler is NOT running. The cooler may not be plugged into its 115 volt supply or the 4 pin cooler control cable is disconnected or defective.
27. If the readings are not present, the control board may be faulty
28. If any of the tests fail, the board may be faulty.
29. If faulty, perform the ***Input Control Board Removal And Replacement Procedure***.
30. Perform the ***Case Cover Replacement Procedure***.

INPUT CONTROL BOARD TEST *(continued)*

Figure F.38 – Input control board plug and LED locations

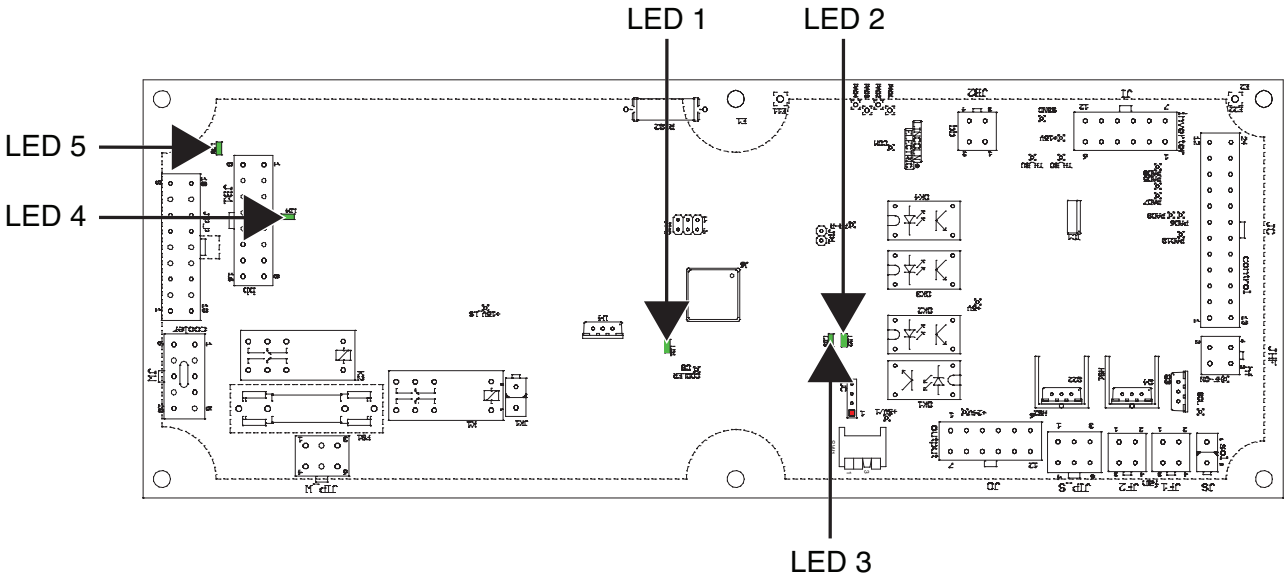
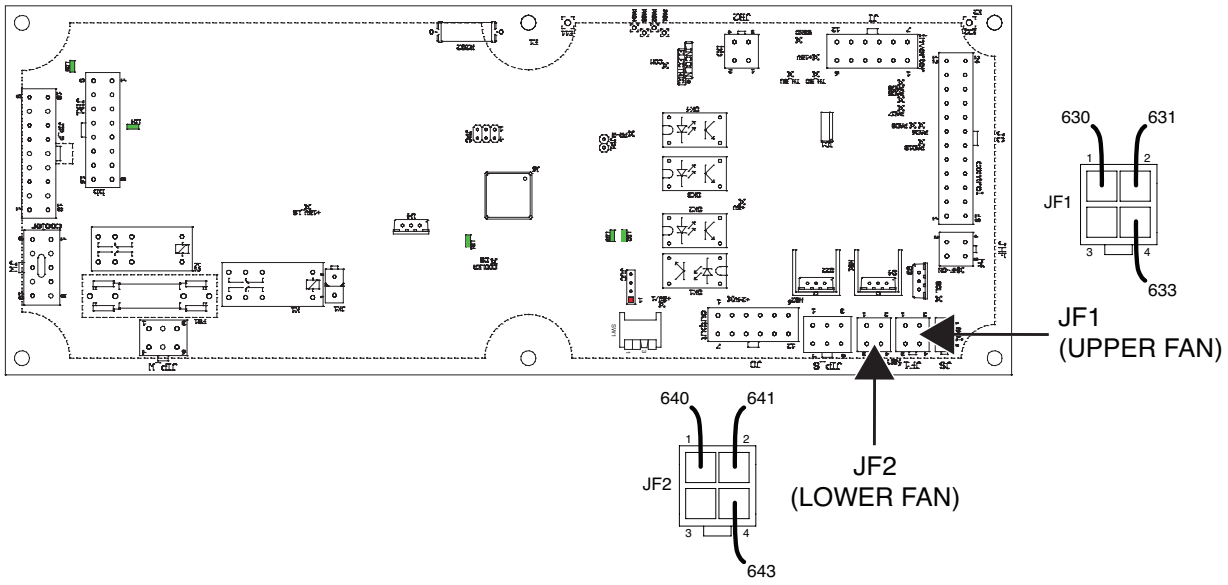


Figure F.39 – Input control board main fan control plug and pin locations



INPUT CONTROL BOARD TEST *(continued)*

Table F.18 – Input control board LEDs

LED#	COLOR	FUNCTION
1	GREEN	CPLD HAS SOFTWARE AND IS WORKING
2	GREEN	ON FOR 3 PHASE INPUT, OFF FOR SINGLE PHASE.
3	GREEN	ON = CORRECT INPUT VOLTAGE. OFF = UNDERVOLTAGE. BLINKING = OVERVOLTAGE
4	GREEN	BOOST DRIVE FUNCTIONING
5	GREEN	BUCK DRIVE FUNCTIONING

Table F.19 – Main fan control section voltage tests

PLUG AND PIN LOCATION		EXPECTED READING	TESTING FACTS / CONDITIONS
PLUG JF1 (UPPER FAN)	PLUG JF2 (LOWER FAN)		
PIN 4 (LEAD 633) TO PIN 1 (LEAD 630)	PIN 4 (LEAD 643) TO PIN 1 (LEAD 640)	24 VDC SUPPLY	SUPPLIED FROM THE INPUT POWER BOARD
PIN 2 (LEAD 631) TO PIN 1 (LEAD 630)	PIN 2 (LEAD 641) TO PIN 1 (LEAD 640)	2.0 VDC APPROXIMATELY	SLOW SPEED COMMAND (OCV OR IDLE)
		5.0 VDC	FAST SPEED COMMAND (NEEDS OUTPUT CURRENT DRAW)

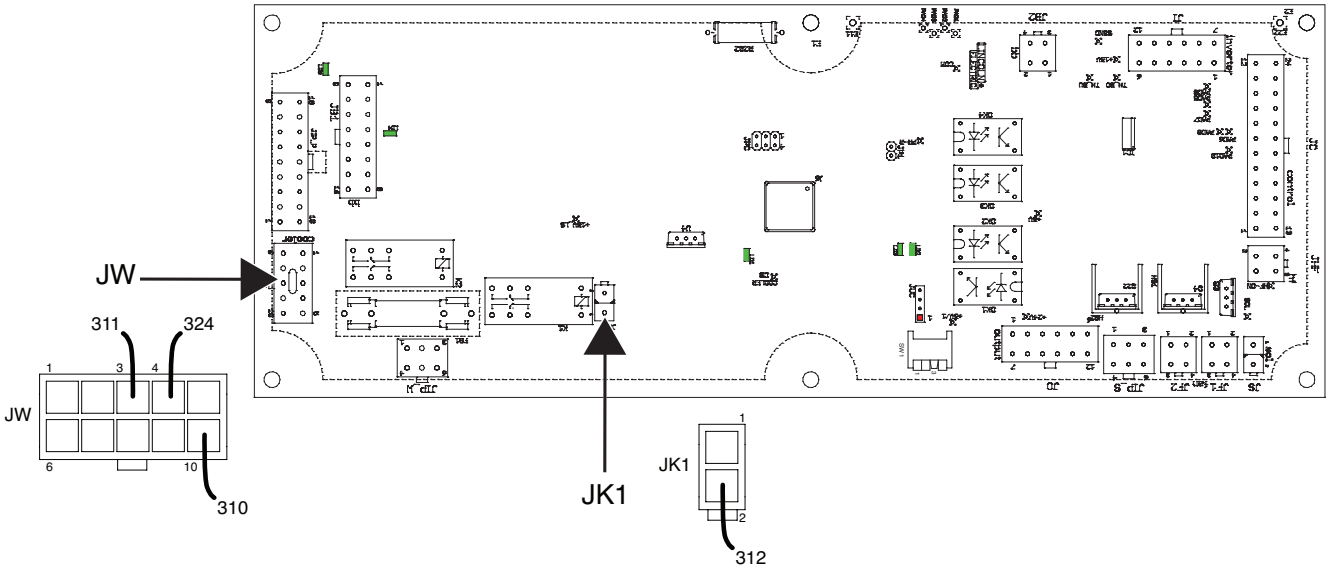
Table F.20 – Cooler control section voltage tests

PLUG(S)	TEST POINTS	EXPECTED READING	CONDITIONS AND TEST
JW	PIN 4 (LEAD 324) TO PIN 3 (LEAD 311)	+10 VDC	WEAK SUPPLY FOR SENSING OF COOLER (CABLE CONNECTED). 0 VDC (NOT PLUGGED IN).
JW	PIN 10 (LEAD 310) TO PIN 3 (LEAD 311)	+10 VDC	COOLER CABLE ID IS CONNECTED. 0 VDC NOT CONNECTED.
JK1 AND JW	PIN 2 (LEAD 312) TO PIN 3 (LEAD 311)	+15 VDC	COOLER MOTOR AND FAN SHOULD START RUNNING. K1 RELAY IN COOLER SHOULD ENERGIZE.
JW	PIN 4 (LEAD 324) TO PIN 10 (LEAD 310)	+15 VDC	COOLER CABLE NOT PLUGGED IN, PLUGGED IN = 0 VDC.

NOTE: There is a delay at times before 115 AC builds when +15 command is sent.

INPUT CONTROL BOARD TEST *(continued)*

Figure F.40 – Cooler control section plug and pin locations



INPUT POWER BOARD TEST

⚠ WARNING

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

TEST DESCRIPTION

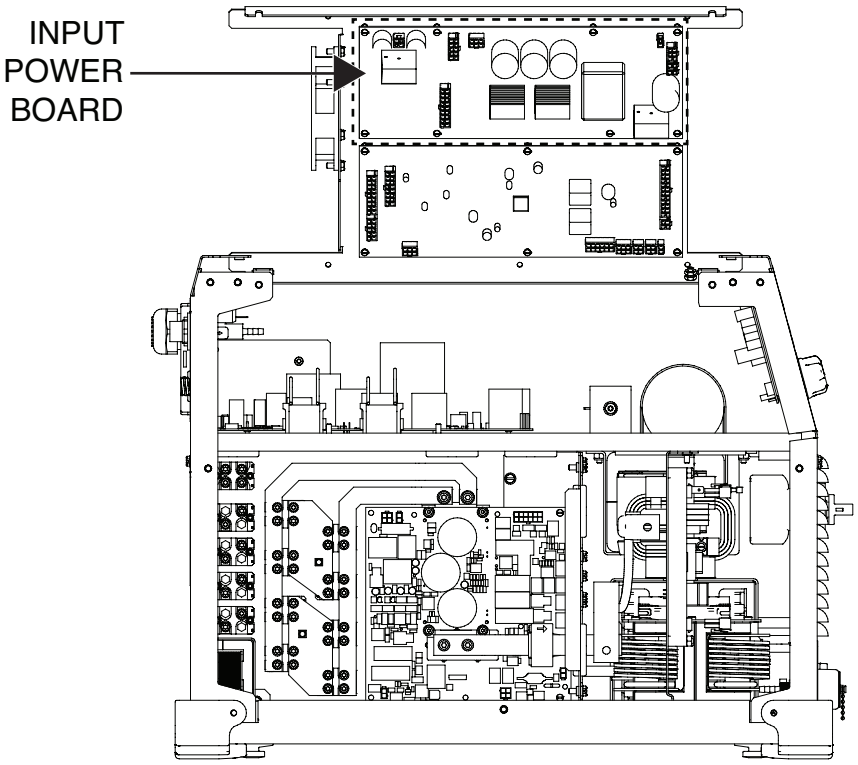
This test will help determine if the Input Power Board is functioning properly.

MATERIALS NEEDED

Digital Volt/Ohmmeter (Fluke 87 Or Better)
3 Phase Input Power
3 Harness Jumper (Part #S18250-1070)
Wiring Diagram

INPUT POWER BOARD TEST *(continued)*

Figure F.41 – Input power board location



PROCEDURE

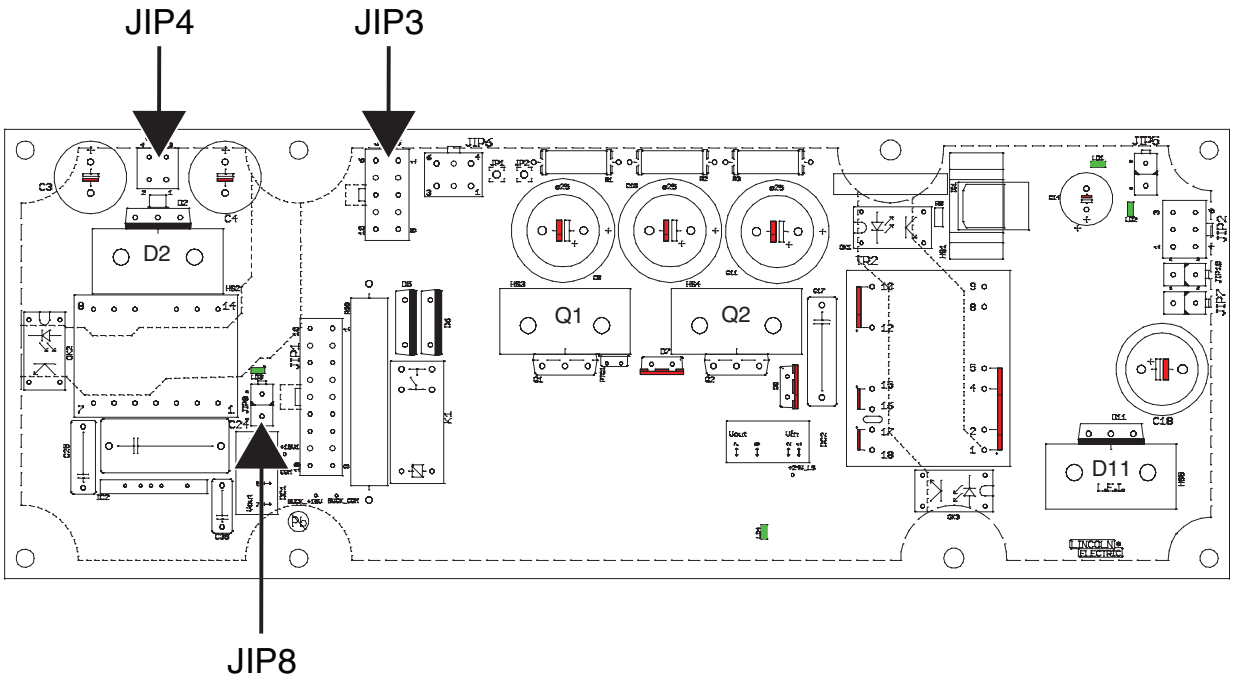
1. Remove the input power to the Aspect 375 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Capacitor Discharge Procedure***.
4. Perform the ***Pre-Test Procedure***.
5. Carefully maneuver the top tray into the upright position by tilting the top tray up and to the right. A non conductive brace will need to be used to hold the top tray in the upright position. See Figure F.41.
6. Locate the input power board. See Figure F.41.
7. Install the 3 harness jumper part #S18250-1070. So the top section can be in the up position and functional for trouble shooting. Connect the harness to plugs JIP4, JIP3 and JIP8 on the input power board. See ***Figure F.42***.
8. Carefully apply the correct input power to the welder.
9. Turn the machine ON.
10. Verify that the four power supply LEDs are illuminated to ensure the input power is being applied to this board and that the board is producing lower level power supplies used throughout the Aspect 375. See ***Figure F.43***. See ***Table F.21***.
11. If the green LEDs are not illuminated, turn off the input power to the welder temporarily then restart (wait three minutes).
12. Locate the JIP3 connector. See ***Figure F.44***.
13. Using a digital volt/ohmmeter, test for the correct 3 phase input power at the JIP3 connector. See ***Table F.22***.

NOTE: This measurement should be checked for all 3 phases at indicated points (phase to phase). Normal input to welder can be from 200 to 600 VAC line voltage applied to the welder and can be measured at the indicated points.

14. If the input voltage is not present, the problem may be in the input diode area. See Wiring Diagram.
15. If the correct input voltage is present at plug JIP3 but the output voltage is missing or not correct per ***Tables F.24*** and ***F.25***, the input power board may be faulty.

INPUT POWER BOARD TEST *(continued)*

Figure F.42 – Input power board harness connection points



75 VDC SUPPLY TEST (FOR OUTPUT BOARD)

16. The input power board generates 75 VDC for the output boards lower level power supplies.
17. Carefully apply the correct input power to the machine.
18. Turn the machine ON.
19. Perform the ***Output Board Test*** (LED Test) to verify that these supplies are being supplied to the output board.
20. Using a digital volt/ohmmeter, test for 75 VDC at plug JIP4 on the input power board. See ***Figures F.44*** and ***F.45***. See ***Table F.23***. See Wiring Diagram.
21. If the 75 VDC is present, the output board may be faulty. If the 75 VDC is NOT present the input power board may be faulty.

NOTE: The 75 VDC is developed from this input power board via the 400 VDC bus.

22. Using a digital volt/ohmmeter, test for 400 VDC from pin 3 (lead 441) to pin 12 (lead 446) at plug JIP1 on the input power board. See ***Figure F.45***. See Wiring Diagram.
23. If the 400 VDC is not present, perform the ***Buck/Boost Board & IGBT Test***.
24. There is a small relay on this board that emits an audible click after a small pre-charge time has elapsed. Once the machine has been turned ON, a precharge resistor is bypassed by this relay. See ***Figure F.46***.
25. If everything is normal you should hear the relay click and the resistor should not overheat with a load on the output of the welder or during OCV conditions. See ***Figure F.46***.
26. If the relay does not click and/or the resistor overheats, then the input power board may be faulty. The buck/boost board may also be faulty, perform the ***Buck/Boost Board & IGBT Test***, non powered up test conditions.
27. Using a digital volt/ohmmeter, perform the tests for low level supply voltages at plug JIP2 on the input power board. See ***Figures F.44*** and ***F.45***. See ***Table F.24***. See Wiring Diagram.
28. Using a digital volt/ohmmeter, perform the tests for low level primary supply voltages for the buck/boost board at plug JIP1 on the input power board. See ***Figures F.44*** and ***F.45***. See ***Table F.25***. See Wiring Diagram.
29. Connect any plugs or leads removed during testing.
30. If any of the tests fail, the input power board may be faulty.
31. If faulty, perform the ***Input Power Board Removal And Replacement Procedure***.
32. Perform the ***Case Cover Replacement Procedure***.

INPUT POWER BOARD TEST *(continued)*

Table F.21 – Input power board LEDs

LED #	COLOR	FUNCTION
1	GREEN	+15 V SUPPLY IS WORKING
2	GREEN	-15 V SUPPLY IS WORKING
3	GREEN	ISOLATED PRIMARY +15 V IS WORKING
4	GREEN	ISOLATED BUCK +15 V SUPPLY IS WORKING

Table F.22 – Input power board input voltage tests JIP3 connector

AC LINE VOLTAGE FOR INPUT POWER BOARD +/- 10%			
PLUG	**LEAD 1A (PIN 1)**	**TO LEAD 2A (PIN 3)**	**TO LEAD 3A (PIN 5)**
MEASUREMENT TAKEN (RATED INPUT LINE) CAN BE FROM 200 TO 600 VAC (3 PHASE)	AC LINE VOLTS	AC LINE VOLTS	AC LINE VOLTS

Table F.23 – JIP4 tests

COMPONENT TEST	TEST POINTS	READING
LEADS / PIN REFERENCE	226 (PIN 3) TO 227 (PIN 4)	75 VDC
LEADS / PIN REFERENCE	224 (PIN 2) TO 225 (PIN 1)	75 VDC

Table F.24 – Low level power supplies tests JIP2 connector

LOW LEVEL POWER SUPPLIES PRODUCED FROM THE INPUT POWER BOARD FOR OTHER BOARDS IN THE ASPECT 375		
TEST POINT (POS)	**TEST POINT (NEG)**	**EXPECTED READING**
PIN 3 (LEAD 433)	PIN 2 (LEAD 432)	-15 VDC SUPPLY
PIN 1 (LEAD 431)	PIN 4 (LEAD 434)	+24 VDC SUPPLY
PIN 6 (LEAD 436)	PIN 4 (LEAD 434)	+15 VDC SUPPLY

Table F.25 – Low level power supplies tests JIP1 connector

LOW LEVEL POWER SUPPLIES PRODUCED FROM THE INPUT POWER BOARD FOR THE BUCK BOOST BOARDS		
TEST POINT (POS)	**TEST POINT (NEG)**	**EXPECTED READING**
PIN 16 (LEAD 448)	PIN 15 (LEAD 447)	+15 VDC SUPPLY
PIN 7 (LEAD 443)	PIN 6 (LEAD 442)	+15 VDC SUPPLY

INPUT POWER BOARD TEST *(continued)*

Figure F.43 – Input power board LED locations

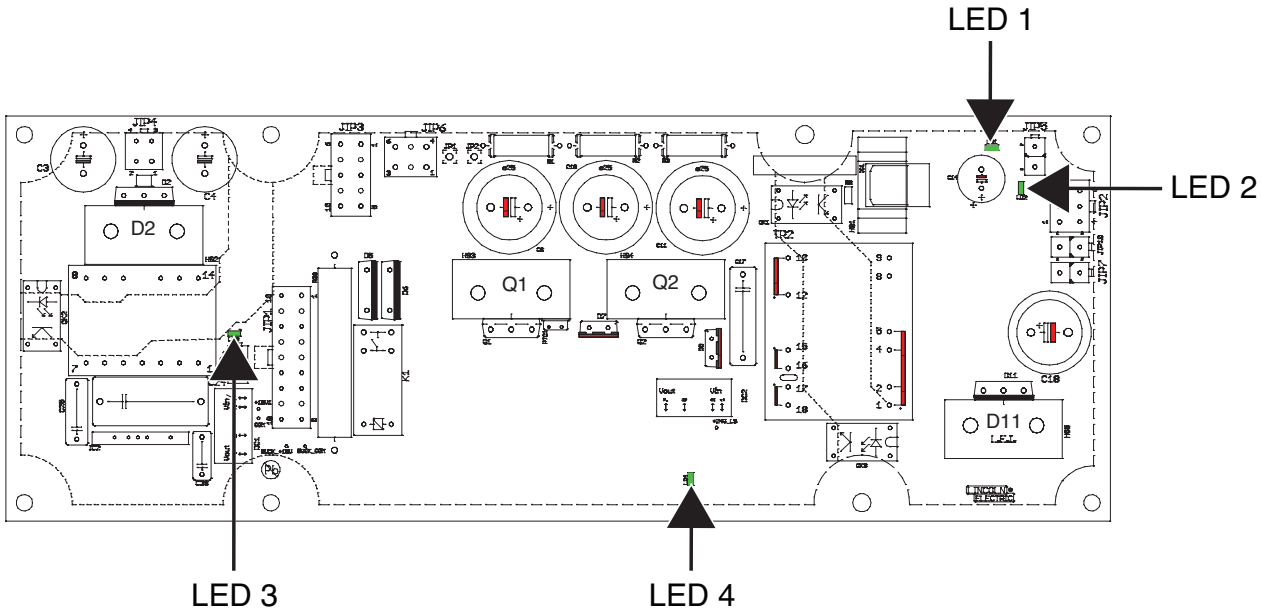
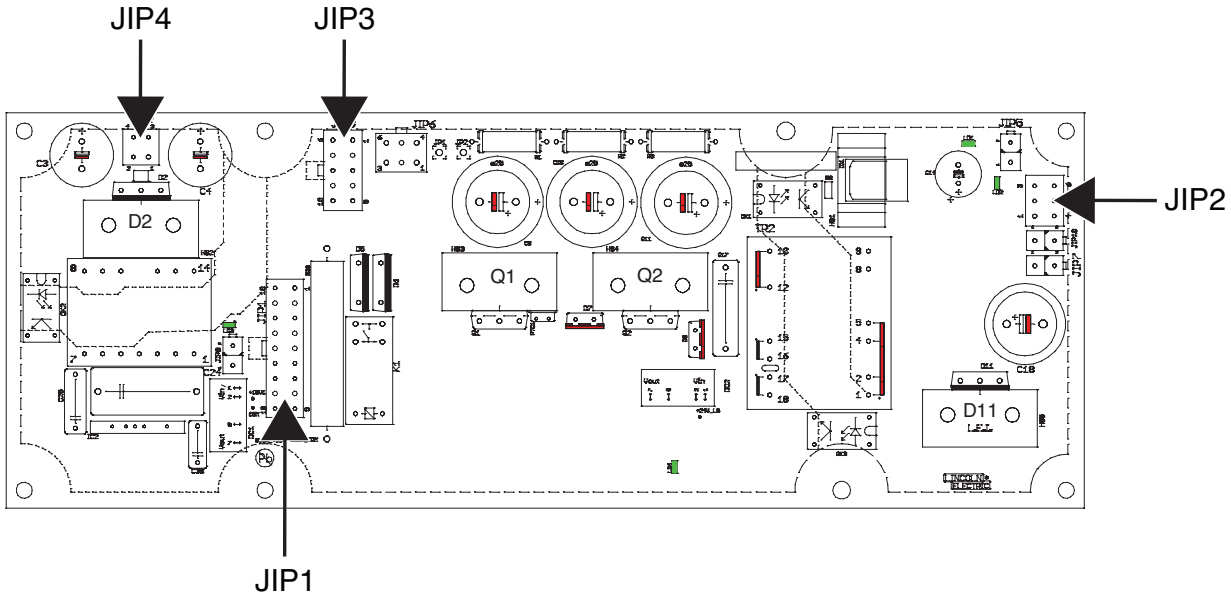


Figure F.44 – Input power board plug locations



INPUT POWER BOARD TEST *(continued)*

Figure F.45 – Input power board lead and pin locations

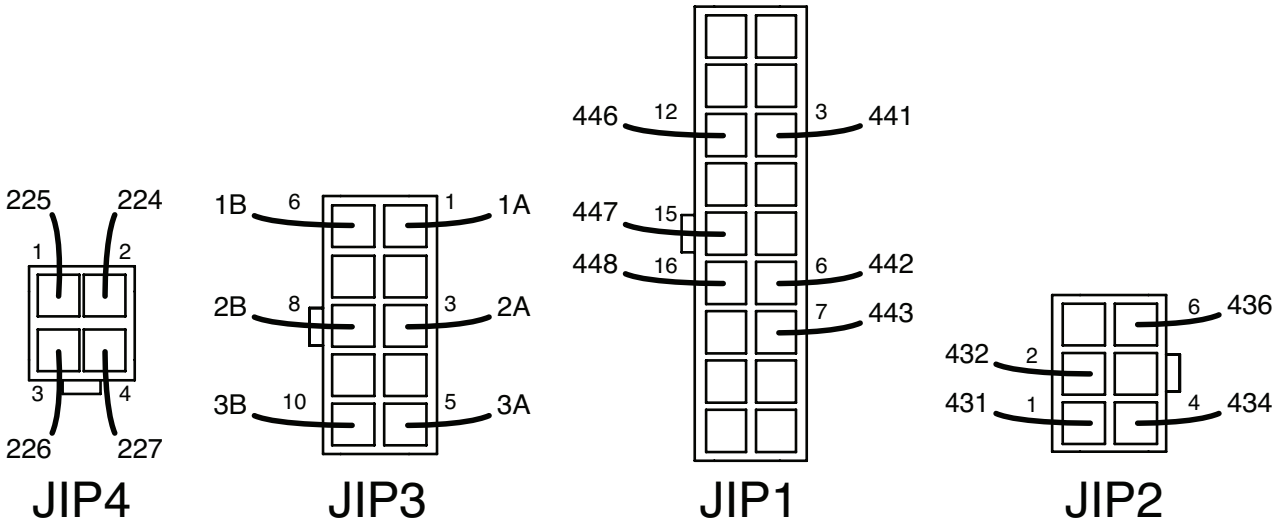
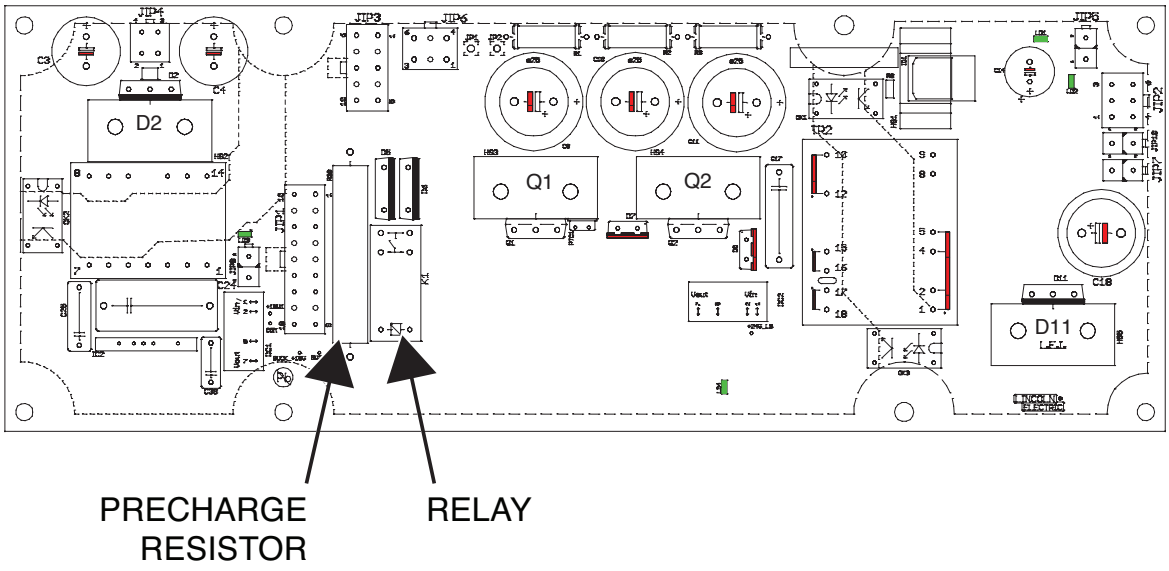


Figure F.46 – Precharge resistor and relay locations



HIGH FREQUENCY & OUTPUT BYPASS CIRCUIT BOARD TEST

⚠ WARNING

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

TEST DESCRIPTION

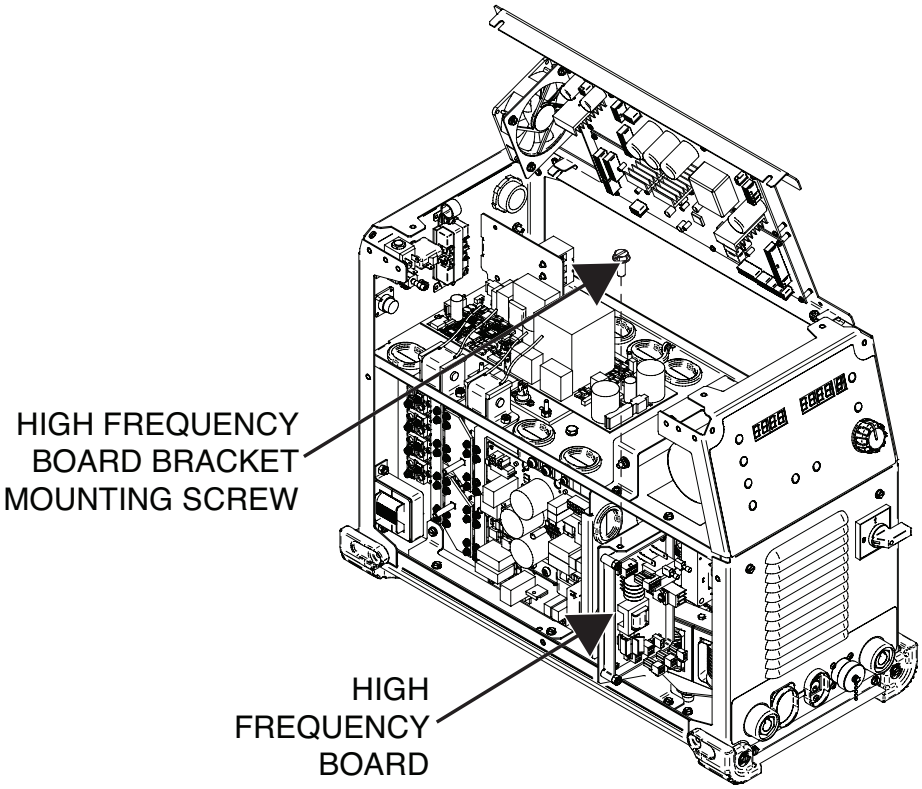
This test will help determine if the High Frequency Board is functioning properly.

MATERIALS NEEDED

3 Harness Jumper (Part #S18250-1070)
Digital Volt/Ohmmeter (Fluke 87 Or Better)
Isolated Jumper Wire Ends Stripped 1/4” or a Lincoln Foot Control K870 Wiring Diagram

HIGH FREQUENCY & OUTPUT BYPASS CIRCUIT BOARD TEST *(continued)*

Figure F.47 – High frequency board location



PROCEDURE

⚠ CAUTION

Do not attempt to measure any voltage across the welders output studs for HF generation / development. Most multi-meters will cease to function and cause permanent damage to the meter.

1. Remove the input power to the Aspect 375 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Capacitor Discharge Procedure***.
4. Perform the ***Pre-Test Procedure***.
5. Locate the high frequency board. See Figure F.47.
6. Using a 5/16" nutdriver, remove the furthest forward screw securing the high frequency board bracket, it can remain plugged in and swung out for testing and for observation of LEDs (facing the front of the machine it will swing to the left).

NOTE: Make sure the bracket is not touching any other electrical leads or components. See Figure F.47.

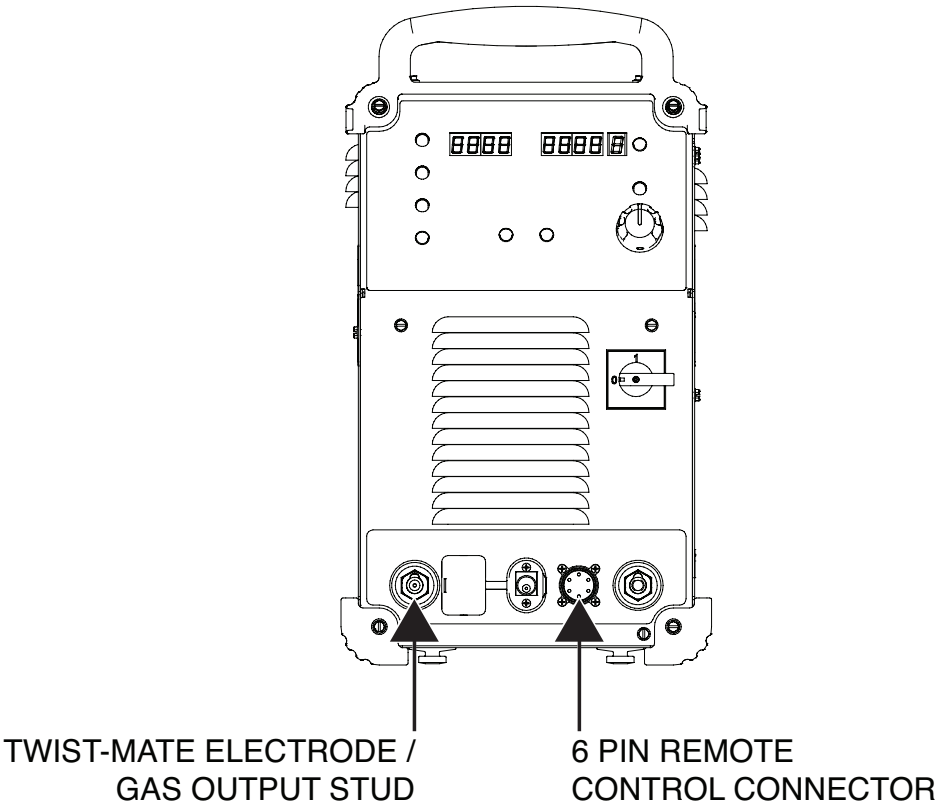
7. Check for any damaged or burnt electrical components. No further testing will be necessary if damage has occurred. Perform the ***High Frequency Board Removal And Replacement Procedure*** if board or components appear damaged.

OUTPUT BYPASS CIRCUIT TEST SECTION

8. Carefully apply the correct input power to the welder.
9. Turn the machine ON.
10. Set the welder in TIG mode and 2 step.
11. Locate the 6 pin remote control connector on the front of the welder. See ***Figure F.48***.
12. Connect a known good TIG torch and connect a regulated ARGON gas typically (20 CFH) to the rear solenoid and turn on the gas. See ***Figure F.48***.
13. Place an insulated jumper wire (ends stripped) into pins E to D on the 6 pin connector or connect a good remote control and set for weld output. See ***Figures F.48*** and ***F.49***.
14. The welder should energize.
15. Verify LED 1 (red) and LED 2 (green) are illuminated. LED 1 indicates a +15 volt supply is being generated on this board. See ***Figure F.50***.

HIGH FREQUENCY & OUTPUT BYPASS CIRCUIT BOARD TEST *(continued)*

Figure F.48 – Gas output stud and remote control connector locations



16. If the LEDs are illuminated and the high frequency is not present at the torch (if one is attached), make sure that the 1000 VDC leads are attached to the high frequency board terminals B1 to B2. See ***Figure F.50***. See Wiring Diagram. These leads go to the high frequency transformer, which supplies high frequency bursts to the output studs.

NOTE: Most meters do not have the ability to observe this voltage. The high voltage is present for starting only. The high frequency will turn off with the output if the welding arc is not struck in a reasonable amount of time. Cleaning action during welding is done with the output board circuits.

HIGH FREQUENCY & OUTPUT BYPASS CIRCUIT BOARD TEST *(continued)*

Figure F.49 – 6 pin remote control connector pins

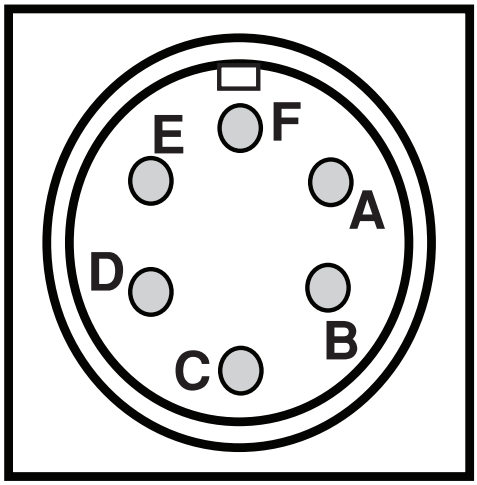
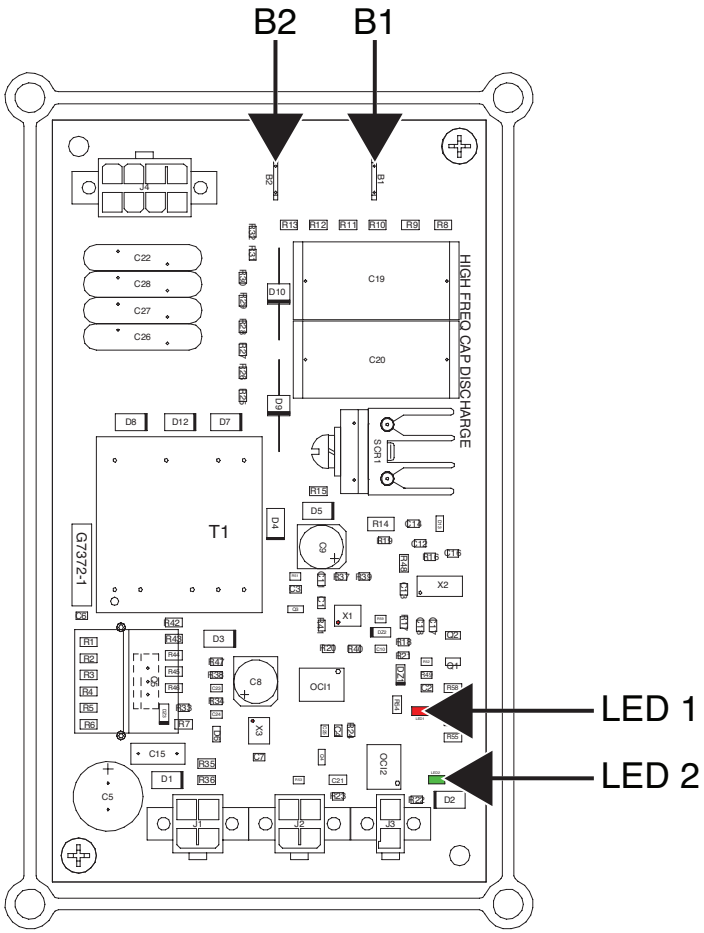


Figure F.50 – High frequency board LED locations



USER INTERFACE BOARD TEST

⚠ WARNING

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

TEST DESCRIPTION

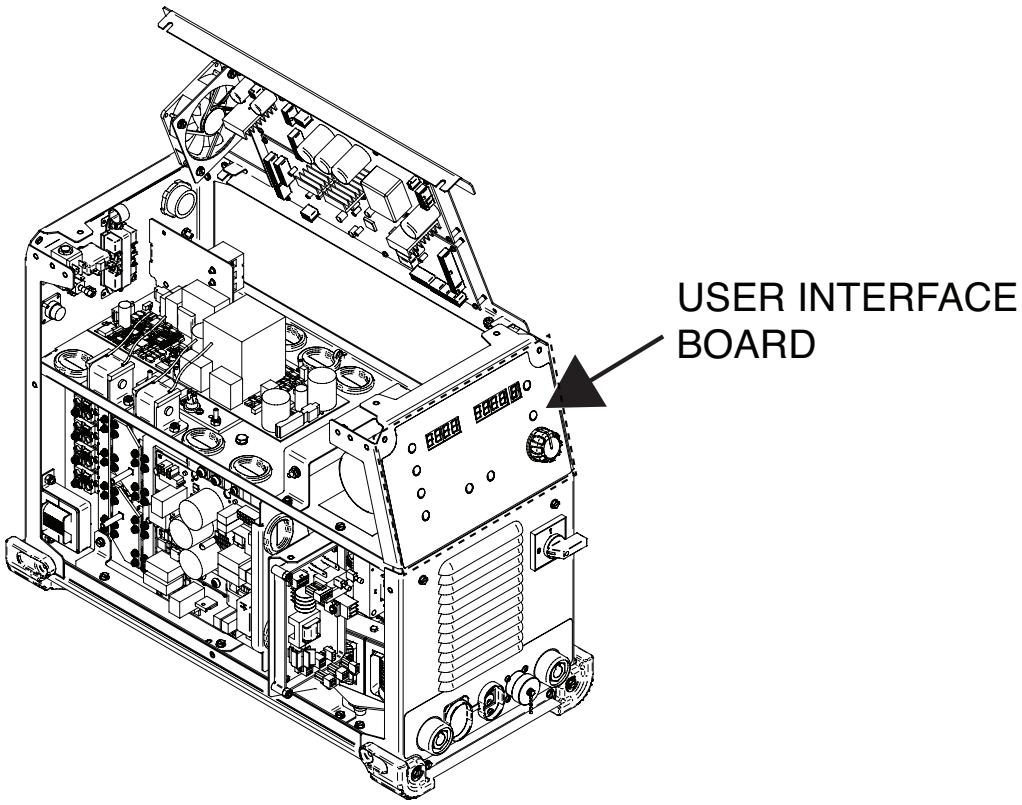
This test will help determine if the User Interface Board is functional.

MATERIALS NEEDED

Digital Volt/Ohmmeter (Fluke 87 Or Better)
3 Harness Jumper (Part #S18250-1070) If Needed
Wiring Diagram

USER INTERFACE BOARD TEST *(continued)*

Figure F.51 – User interface board location



PROCEDURE

1. Remove the input power to the Aspect 375 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Capacitor Discharge Procedure***.
4. Perform the ***Pre-Test Procedure***.
5. Locate the user interface board. See Figure F.51.
6. Apply the correct input power to the machine.
7. Turn the machine ON.
8. Verify that all of the relevant LEDs and displays are illuminated during the initial power up. See ***Figure F.52*** and ***F.53***.

NOTE: The green power ON light flashes during the power up process. Flashing indicates the 400 VDC bus is building up. When the 400 VDC is reached, the light will be a steady green.

9. Visually inspect the surface area of the user interface board for nicks, pin holes, cuts or damage. Most of the time this is the fault that causes the User interface board to fail.
10. If any of the leads, knobs and/or push buttons do not function (if they are designated to for that mode you are testing), the user interface board may be faulty.

NOTE: Push buttons will not be active during a weld or load banking. Stop weld or remove the grid load to make button function return. The output control knob will adjust current during welding or load banking.

11. If the user interface board display is out, perform the ***Control Board Test***.
12. There are helpful extended hidden features for this unit to help with starting and welding problems. See the Operation section of the Operators Manual on how to use these hidden features.
13. There is a factory default RESET feature helpful in troubleshooting found in menu C. See ***Table F.26***.

OUTPUT WELD LEAD TEST

14. Welding leads can be tested with a high current while shorted. Best mode to test in is Stick AC. Welding leads should be no less than 20 feet.
15. Using stick DC mode will cause the Aspect 375 to go into fold back (low current hold mode) this protects its electronics.
16. Test with currents in the 200 amp level. The output current knob can be adjusted during this type of testing.
17. If any tests fail, the user interface board may be faulty.
18. If the board is faulty, perform the ***User Interface Board Removal And Replacement Procedure***.
19. Perform the ***Case Cover Replacement Procedure***.

USER INTERFACE BOARD TEST *(continued)*

Figure F.52 – User interface

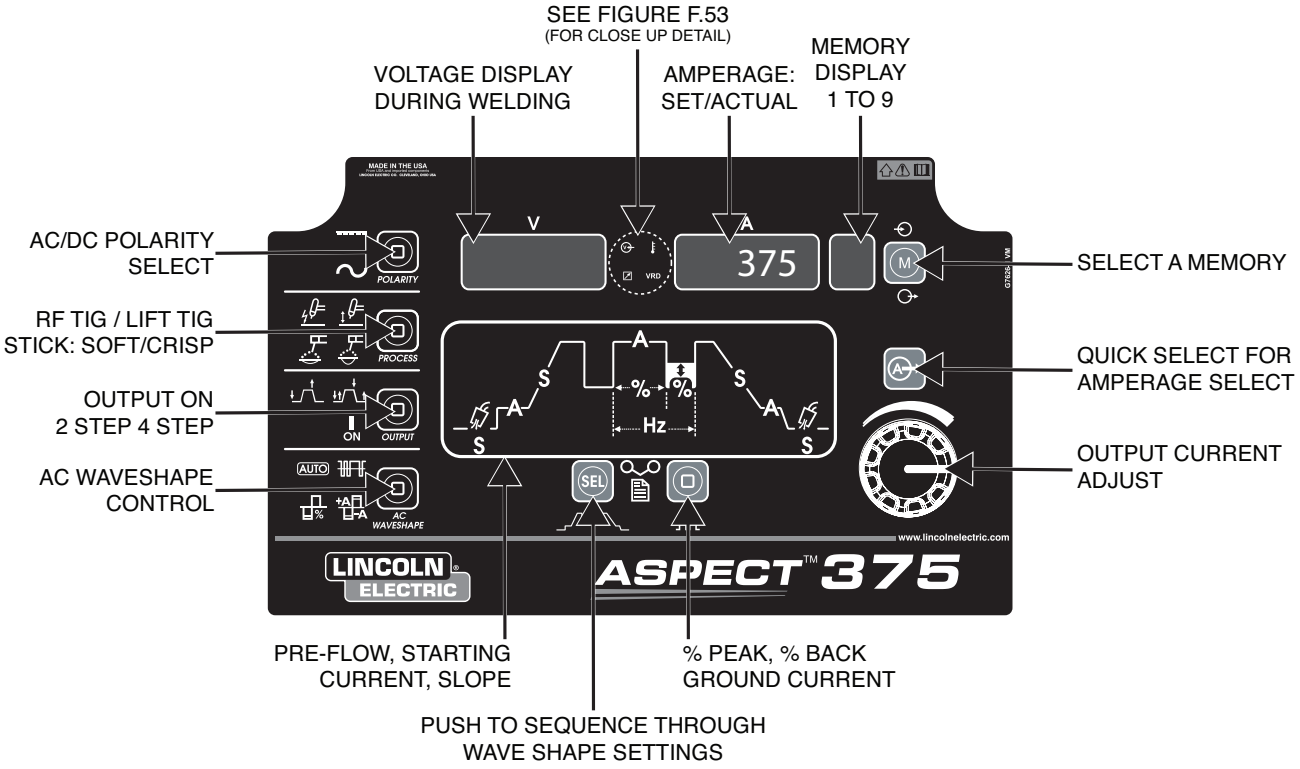
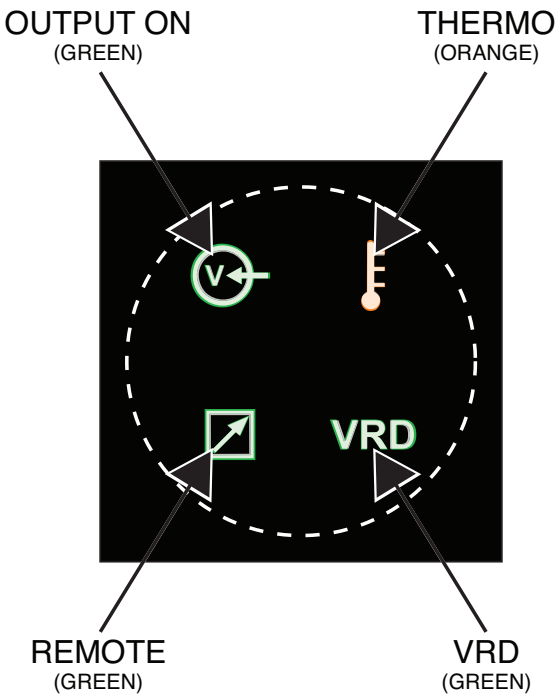


Figure F.53 – Upper center close up detail



USER INTERFACE BOARD TEST *(continued)*

Table F.26 – Resettable features

FOUND IN MENU B	FOUND IN MENU C
ARC FORCE	STARTING POLARITY
HOT START	STARTING CURRENT
STICK POLARITY	STARTING TIME
SPOT TIMER	STARTING SLOPE
	PRESET CURRENT MINIMUM

CONTROL BOARD TEST

⚠ WARNING

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

TEST DESCRIPTION

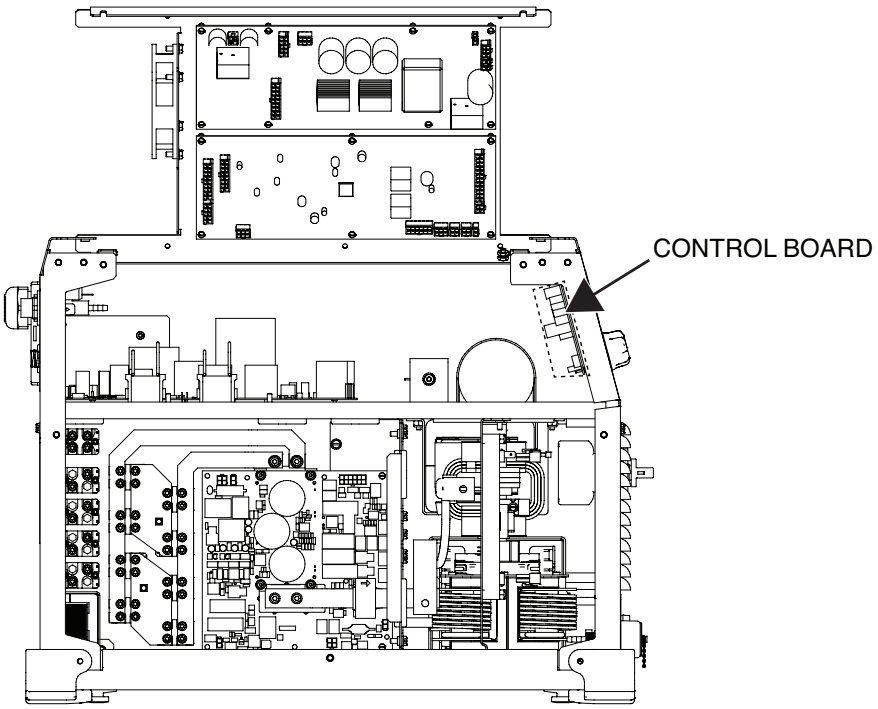
This test will help determine if the Control Board is functioning.

MATERIALS NEEDED

Digital Volt/Ohmmeter (Fluke 87 Or Better)
Small Encapsulation Piercing Meter Tips
Load Bank, Stick & Tig Welding Ability Also
A Known Good K870-1 Or K963-1 Remote Control (6 Pin Type Amphenol End)
Wiring Diagram

CONTROL BOARD TEST *(continued)*

Figure F.54 – Control board location



PROCEDURE

1. Remove the input power to the Aspect 375 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Capacitor Discharge Procedure***.
4. Perform the ***Pre-Test Procedure***.
5. Locate the control board. See Figure F.54.
6. Apply the correct input power to the machine.
7. Turn the machine ON.
8. Verify the three power supply LEDs are illuminated and make certain the input power is present at the control board and that the control board is producing lower +5 volt level power supplies used for the user interface board. See ***Table F.27***. See ***Figure F.55***.
9. If the LEDs are not illuminated, verify that the input power board is generating the low level power supplies for the control board.
10. Using the digital volt/ohmmeter, perform the voltage tests at plug JIP2 on the input power board. See ***Figure F.56***. See ***Table F.28***. See Wiring Diagram.
11. Verify that the control board dip switches are in the OFF position (UP). See ***Figure F.55***.
12. Using a digital volt/ohmmeter, test the control boards command logic at plug JC1. See ***Figure F.55*** and ***F.57***. See ***Table F.29***. See Wiring Diagram.
13. Using a digital volt/ohmmeter, perform the voltage tests on plug JC1 on the control board. See ***Figure F.55*** and ***F.57***. See ***Table F.30***. See Wiring Diagram.

REMOTE CONTROL SECTION TEST

14. Connect a known good Lincoln remote control into the 6 pin remote control connector. See ***Figure F.58***.
15. The welder automatically senses when the remote is connected.
16. The remote should be recognized on the user interface board. A light on the top center of the user interface board should illuminate. See ***Figure F.59***.
17. Locate plug JC4 (6 pin molex for the remote), on the control board. See ***Figure F.55***.
18. Using a digital volt/ohmmeter set to DC volts, perform the tests on plug JC4 of the control board. See ***Figure F.55*** and ***F.60***. See ***Table F.31***.
19. If the remote control test voltages are present and there is no ability to adjust the output of the welder, then the control board may be faulty.
20. If the voltages are not present, the remote device may be faulty.
21. If the board is faulty, perform the ***Control Board Removal And Replacement Procedure***.
22. Perform the ***Case Cover Replacement Procedure***.

CONTROL BOARD TEST *(continued)*

Figure F.55 – Control board LED and plug locations

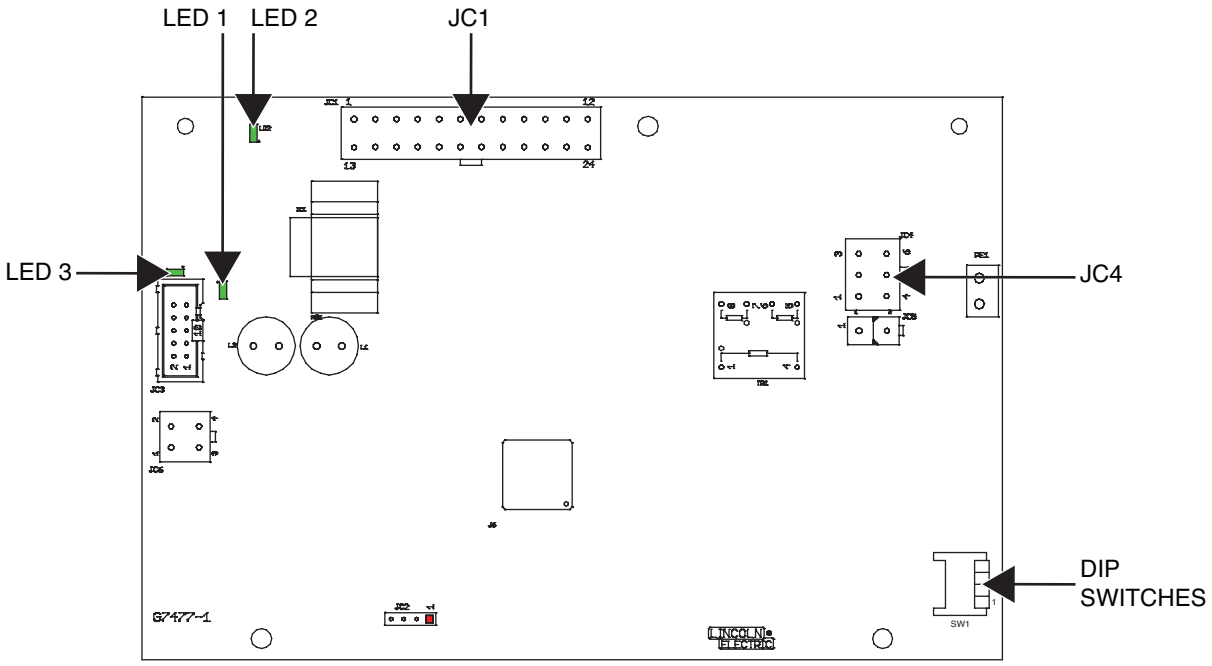


Table F.27 – Control board LEDs

LED#	COLOR	FUNCTION
1	GREEN	+5 VOLT SUPPLY WORKING
2	GREEN	+15 VOLT SUPPLY WORKING
3	GREEN	-15 VOLT SUPPLY WORKING

CONTROL BOARD TEST *(continued)*

Figure F.56 – Input power board test point locations

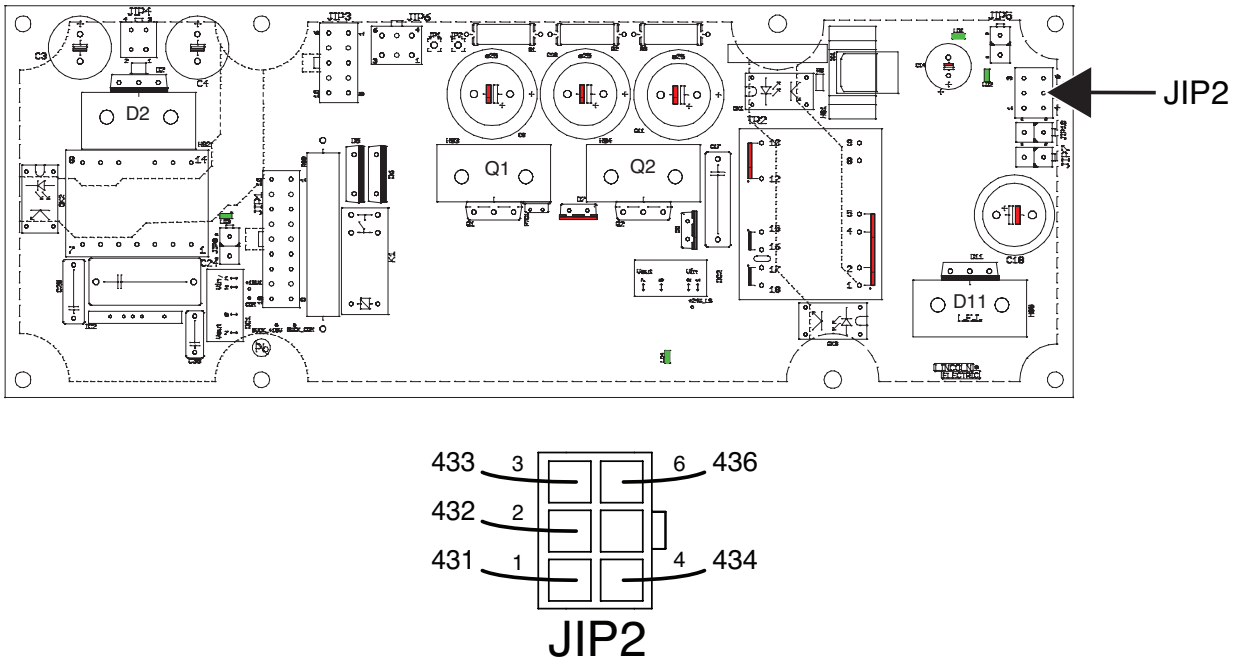


Table F.28 – Input power board test points

LOW LEVEL POWER SUPPLIES PRODUCED FROM THE INPUT POWER BOARD FOR OTHER BOARDS IN THE ASPECT 375			
PLUG	**TEST POINT**	**TEST POINT**	**EXPECTED READING**
JIP2 (INPUT POWER BOARD)	PIN 3 (LEAD 433)	PIN 2 (LEAD 432)	-15 VDC SUPPLY
JIP2 (INPUT POWER BOARD)	PIN 1 (LEAD 431)	PIN 4 (LEAD 434)	+24 VDC SUPPLY
JIP2 (INPUT POWER BOARD)	PIN 6 (LEAD 436)	PIN 4 (LEAD 434)	+15 VDC SUPPLY

CONTROL BOARD TEST *(continued)*

Table F.29 – AC switch control board commands logic

TEST POINT	TEST POINT	EXPECTED READINGS	CONDITIONS
PIN 24 (LEAD 29)	PIN 2 (LEAD 6)	+15 VDC = OFF 0 VDC = ON (NEGATIVE OF AC SWITCH)	0 VDC COMMAND = NEGATIVE POTENTIAL SHOULD BE SEEN ON THE ELECTRODE TO WORK STUD. USING STICK MODE LOADED.
PIN 23 (LEAD 28)	PIN 2 (LEAD 6)	+15 VDC = OFF 0 VDC = ON (POSITIVE OF AC SWITCH)	0 VDC COMMAND = POSITIVE POTENTIAL SHOULD BE SEEN ON THE ELECTRODE TO WORK STUD. USING STICK MODE LOADED.

Table F.30 – Control board pin configuration for "JC" connector

ALL WILL HAVE REFERENCE TO SEC COMMON AT PIN 2				
SIGNAL DEFINITION	**TEST POINT**	**TEST POINT**	**EXPECTED READINGS**	**CONDITION**
NEG SWITCH	PIN 24 (LEAD 29)	PIN 2 (LEAD 6)	+15 VDC = OFF 0 VDC = ON BOTH 7.5 VDC = AC	OUTPUT LOADED
POS SWITCH	PIN 23 (LEAD 28)	PIN 2 (LEAD 6)		
BACKGROUND	PIN 16 (LEAD 20)	PIN 2 (LEAD 6)		
LIFT TIG	PIN 13 (LEAD 17)	PIN 2 (LEAD 6)	+15 VDC = OFF 7.5 VDC = ON	PUSH LIFT TIG BUTTON
FAN ON COMMAND	PIN 21 (LEAD 26)	PIN 2 (LEAD 6)	+24 VDC = OFF	LOAD WELDER DEPRESS FOOT PEDAL
SOLENOID	PIN 17 (LEAD 22)	PIN 2 (LEAD 6)		
FAN 1 COMMAND	PIN 3 (LEAD 7)	PIN 2 (LEAD 6)		
RF ON COMMAND	PIN 8 (LEAD 12)	PIN 2 (LEAD 6)	+15 VDC = OFF 0 VDC = ON	DEPRESS FOOT PEDAL
RF ON COMMAND	PIN 18 (LEAD 23)	PIN 2 (LEAD 6)	+15 VDC = ON 0 VDC = OFF	DEPRESS FOOT PEDAL
SNUBBER FAULT	PIN 19 (LEAD 24)	PIN 2 (LEAD 6)	0 V = ERROR +5 VDC = ERROR	
INPUT ERROR	PIN 9 (LEAD 13)	PIN 2 (LEAD 6)		
INPUT BOARD THERMO ERROR	PIN 15 (LEAD 19)	PIN 2 (LEAD 6)	0 V = ERROR +5 = OK	PULL THE BUCK J3 MOLEX FOR ITS PTC DEVICE.
UNIT THERMO ERROR	PIN 11 (LEAD 15)	PIN 2 (LEAD 6)		
SUPPLY (INPUT)	PIN 1 (LEAD 5)	PIN 2 (LEAD 6)	+15 VDC	WELDER TURNED ON
SUPPLY COMMON	PIN 2 (LEAD 6)	PIN 2 (LEAD 6)	SEE COMMON	
FAN SPEED	PIN 14 (LEAD 18)	PIN 2 (LEAD 6)	2 VDC = SLOW SPEED 5 VDC = HIGH SPEED	OCV CONDITION OUTPUT LOADED
OUTPUT CURRENT	PIN 4 (LEAD 8)	PIN 2 (LEAD 6)	2 VDC = 150 V	OUTPUT LOADED AC OR DC
OUTPUT VOLTS	PIN 5 (LEAD 9)	PIN 2 (LEAD 6)	1 VDC = 10 VDC (DC POLARITY) 1 VAC = 10 VAC (AC POLARITY)	OUTPUT LOADED
I SET SIGNAL (ALSO TRIGGER)	PIN 12 (LEAD 16)	PIN 2 (LEAD 6)	1 VDC = 50 AMPS 0 V = NO OUTPUT, V = OUTPUT	AC OR DC OUTPUT LOADED
SUPPLY (INPUT)	PIN 1 (LEAD 5)	PIN 2 (LEAD 6)	+15 VDC SEC COMMON	WELDER TURNED ON
SUPPLY COMMON	PIN 2 (LEAD 6)	PIN 2 (LEAD 6)		

CONTROL BOARD TEST *(continued)*

Figure F.57 – Plug JC1 pin and lead locations

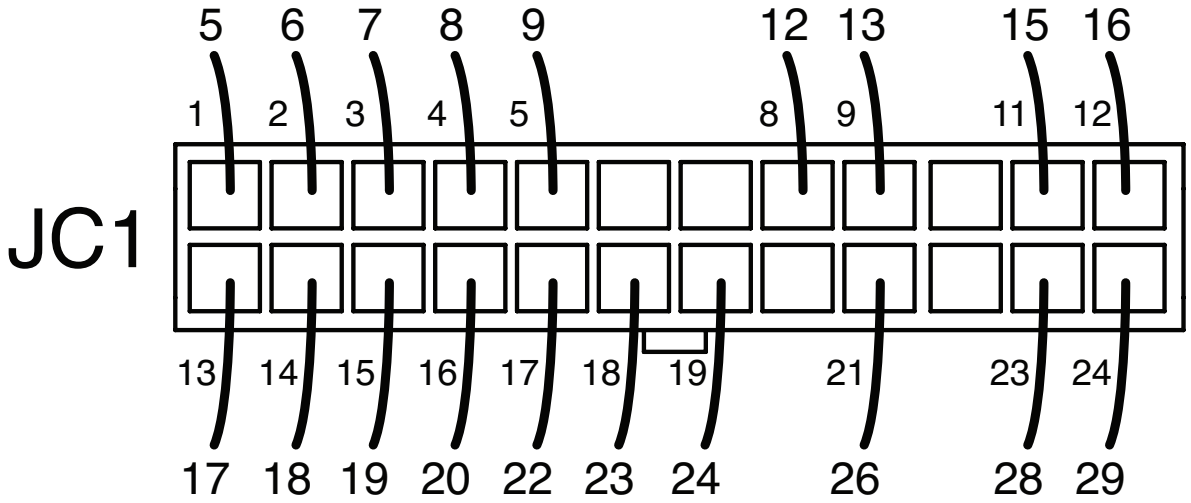
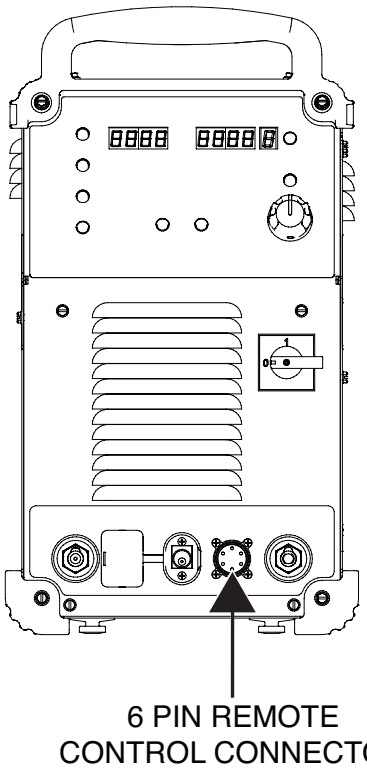


Figure F.58 – 6 pin remote control connector



CONTROL BOARD TEST *(continued)*

Figure F.59 – User interface board remote light location

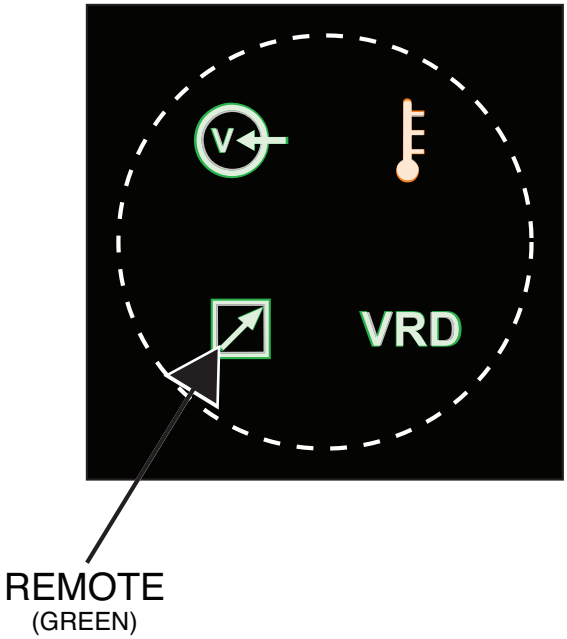
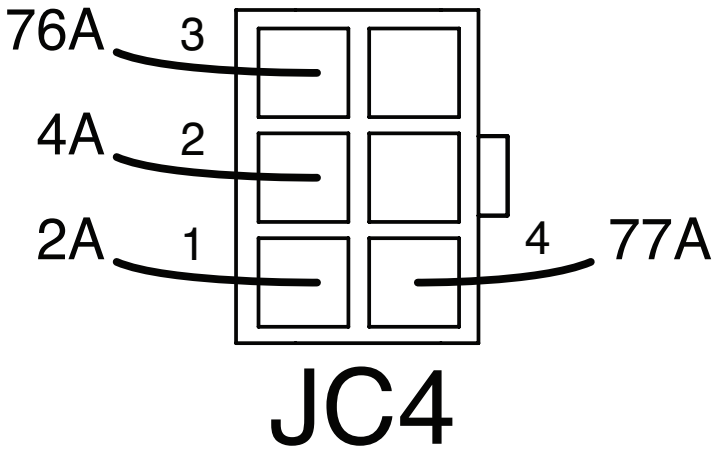


Table F.31 – JC4 molex pin

TEST POINT	TEST POINT	REMOTE DEVICE POSITION	EXPECTED RESULTS
PLUG JC4 PIN 4 (LEAD 77A)	PLUG JC4 PIN 3 (LEAD 76A)	PEDAL RELAXED (OFF)	+10 VDC
PLUG JC4 PIN 4 (LEAD 77A)	PLUG JC4 PIN 3 (LEAD 76A)	PEDAL DOWN (FULL ON)	.5 VDC TO .2 VDC = MAX OUTPUT
PLUG JC4 PIN 2 (LEAD 4A)	PLUG JC4 PIN 1 (LEAD 2A)	PEDAL RELAXED (OUTPUT OFF)	14 VDC TO 15 VDC = OUTPUT OFF
PLUG JC4 PIN 2 (LEAD 4A)	PLUG JC4 PIN 1 (LEAD 2A)	PEDAL DOWN (OUTPUT ON)	0 VDC TO .5 VDC = OUTPUT ON

CONTROL BOARD TEST *(continued)*

Figure F.60 – JC4 molex pin



115V AUXILIARY BOARD TEST

⚠ WARNING

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

TEST DESCRIPTION

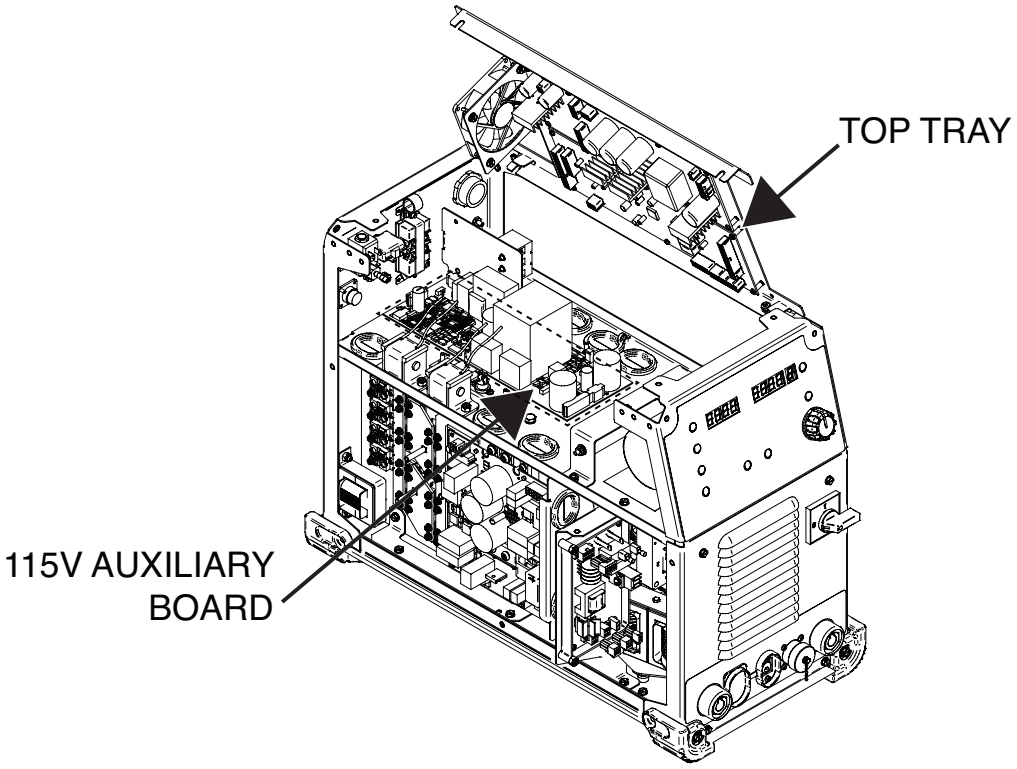
This test will help determine if the 115V Auxiliary Board is functioning.

MATERIALS NEEDED

Digital Volt/Ohmmeter (Fluke 87 Or Better)
Small Drill Or Fan For Load Testing Of Auxiliary
3 Harness Jumper (Part #S18250-1070)
Non Conductive Brace
Wiring Diagram

115V AUXILIARY BOARD TEST *(continued)*

Figure F.61 – 115V auxiliary board location



PROCEDURE

⚠ CAUTION

The input power will be ON and connected to the welder. The welder will need to be energized during some of this testing. This area of the welder has a small fan blowing across the boards for cooling.

1. Remove the input power to the Aspect 375 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Capacitor Discharge Procedure***.
4. Perform the ***Pre-Test Procedure***.
5. Carefully maneuver the top tray into the upright position by tilting the top tray up and to the right. A non conductive brace will need to be used to hold the top tray in the upright position. See Figure F.61.
6. Install the 3 harness jumper part #S18250-1070 so the top section can be in the up position and functional for trouble shooting. See Figure F.61. Connect the harness to plugs JIP4, JIP3 and JIP8 on the input power board. See ***Figure F.62***.
7. Locate the 115V auxiliary board. See Figure F.61.
8. Carefully apply the correct input power to the machine.
9. Turn the machine ON.
10. Verify the three green troubleshooting LEDs are illuminated. See ***Table F.32***. See ***Figure F.63***.
11. If the RED LED 1 is illuminated, it should be flashing an error code. See ***Table F.33*** for error codes. See ***Figure F.64***. See suggestions for different error code solutions. If the LED is ON steady, the CPU is locked up, perform the ***115V Auxiliary Board Removal And Replacement Procedure***.

INPUT POWER SECTION TEST

12. Locate plug J3 on the 115V auxiliary board. See ***Figure F.64***. See Wiring Diagram.

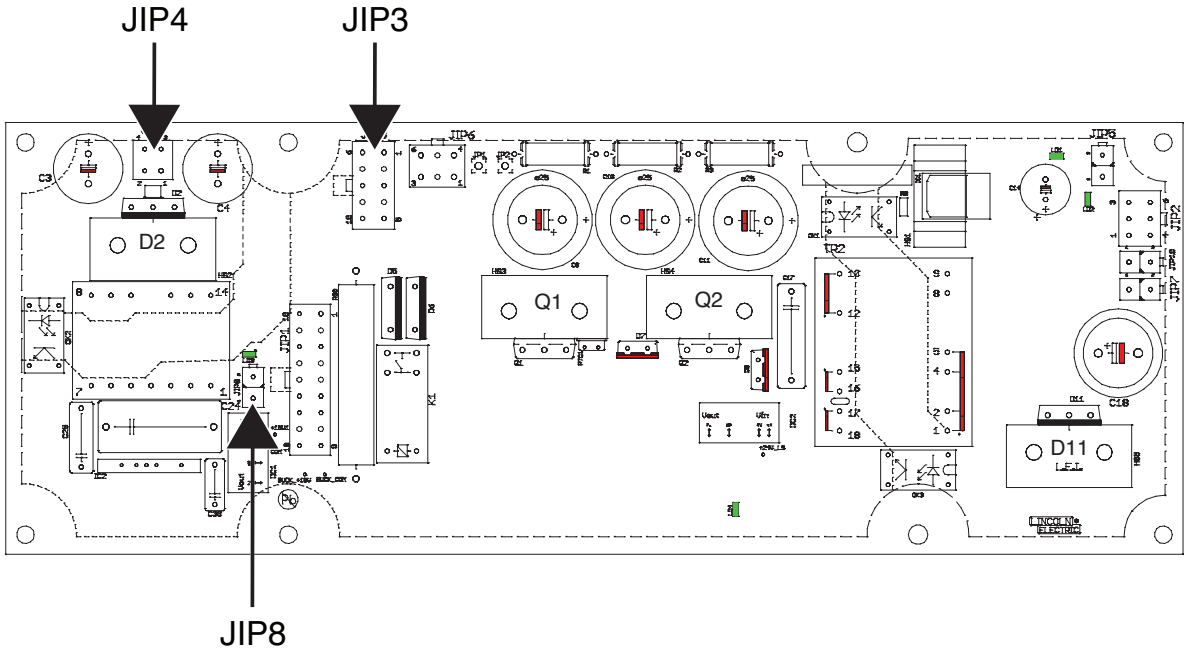
⚠ CAUTION

400 VDC is present during this testing and around the area of the welder.

13. Using a digital volt/ohmmeter set to DC volts, measure normal polarity input power to board and low voltage input power on plug J3. See ***Table F.34***. See ***Figures F.63*** and ***F.64***.
14. If the 400 VDC is not measured, possible faulty buck/boost board, input control board or their lead connections. Perform the ***Buck/Boost Board & IGBT Test*** and/or the ***Input Control Board Test***.
15. If the voltages are present, proceed with the output power section testing.

115V AUXILIARY BOARD TEST *(continued)*

Figure F.62 – 3 harness jumper input power board connection points



OUTPUT POWER SECTION TESTING

16. Locate plug J1 on the 115V auxiliary board. See ***Figure F.63***. See Wiring Diagram.
17. Using a digital volt/ohmmeter set to AC volts, measure normal output of the plug J1 connector. See ***Figures F.63*** and ***F.64***. See ***Table F.35***.
18. Using a digital volt/ohmmeter, test for 115 VAC on plug J1 with a small hand drill or small desk fan (turned on or running) for a loaded condition applied to the 115 VAC outlet on the rear of the welder. See ***Table F.35***.
19. If any of the tests fail, the 115V auxiliary board may be faulty. The circuit breaker or duplex receptacle (on the rear of the welder) may be faulty.

THERMOSTAT SECTION TESTING

20. Remove the input power to the Aspect 375 machine.
21. Perform the ***Capacitor Discharge Procedure***.
22. Using a digital volt/ohmmeter set to test resistance, measure the resistance of plug J1. Normally closed thermostat circuit room temp = 0 ohms resistance lead 332 (pin 2) to lead 331 (pin 1). See ***Figures F.63*** and ***F.64***. See Wiring Diagram.
23. If any tests fail, the board may be faulty.
24. If the board is faulty, perform the ***115V Auxiliary Board Removal And Replacement Procedure***.
25. Perform the ***Case Cover Replacement Procedure***.

115V AUXILIARY BOARD TEST *(continued)*

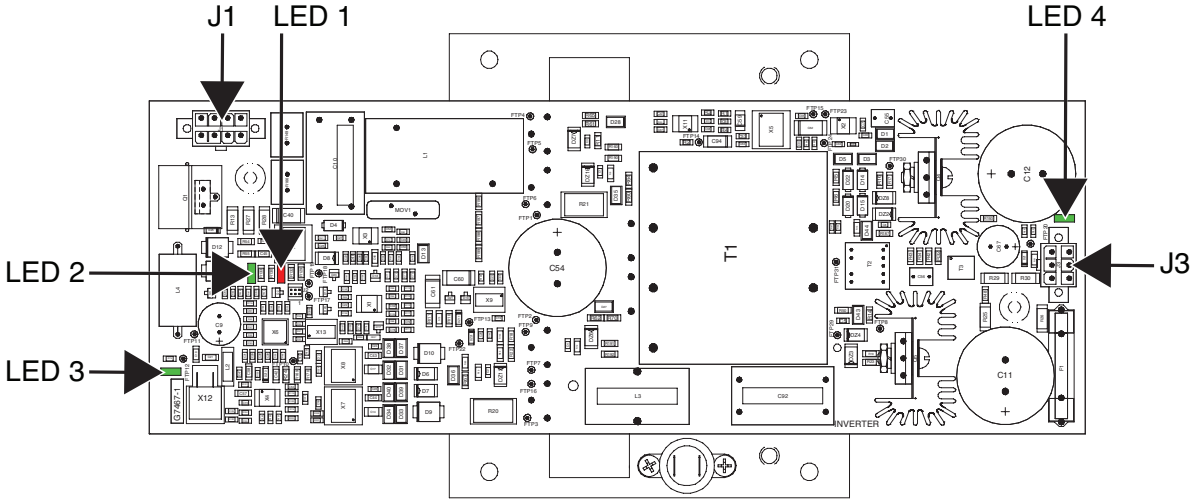
Table F.32 – 115V auxiliary board LEDs

LED#	COLOR	FUNCTION
1	RED	ERROR CODE (LED WILL FLASH CODE)
2	GREEN	ILLUMINATED WHEN NO ERRORS HAVE OCCURRED.
3	GREEN	BOARD POWER SUPPLY IS WORKING.
4	GREEN	+15 V INPUT IS PRESENT.

Table F.33 – 115V auxiliary board error codes

ERROR	EXPLANATION	SUGGESTIONS
2	THERMAL FAULT	THERMOSTAT MAYBE DEFECTIVE, BOARD NEEDS REPLACED. BOARD MAY NOT BE PHYSICALLY TIGHT TO ITS MOUNTING PLACE (POOR HEAT TRANSFER CONDITION). AMBIENT TEMPERATURE MAY BE TOO HIGH. UPPER COMPARTMENT FAN IS NOT RUNNING.
3	15 V CONTROL UNDERVOLTAGE	PERFORM THE ***INPUT POWER BOARD TEST*** OR A WIRELESS REMOTE OR REMOTE IS DEFECTIVE. BAD ON BOARD F1 FUSE. BOARD IS DEFECTIVE IF F1 REPEATS TO BLOW. MAKE SURE THE FUSE IS THE CORRECT SIZE (NOT TOO SMALL).
5	OUTPUT OVER CURRENT	POSSIBLE A DEFECTIVE INVERTER TYPE PRODUCT THAT IS RUNNING OFF OF THIS OUTLET. TRY A SMALL DRILL OR FAN TO TEST IF PROBLEM STILL EXISTS.

Figure F.63 – 115V auxiliary board LED and plug locations



115V AUXILIARY BOARD TEST *(continued)*

Figure F.64 – 115V auxiliary board pin and lead locations

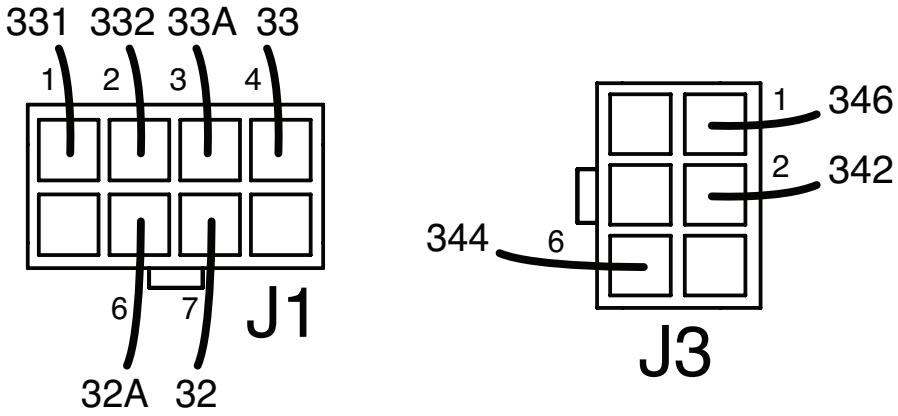


Table F.34 – Input power section tests

BOARD POWER SUPPLY	TEST POINT	TEST POINT	EXPECTED RESULTS
LOW DC POWER	PLUG J3 PIN 2 (LEAD 342)	PLUG J3 PIN 1 (LEAD 346)	+15 VDC
HIGH DC POWER	PLUG J3 PIN 6 (LEAD 344)	PLUG J3 PIN 1 (LEAD 346)	+400 VDC SUPPLY

Table F.35 – Output power section tests

TEST POINT	TEST POINT	EXPECTED RESULT
PLUG J1 PIN 3 (LEAD 33A)	PLUG J1 PIN 4 (LEAD 33)	115 VAC
PLUG J1 PIN 6 (LEAD 32A)	PLUG J1 PIN 7 (LEAD 32)	115 VAC

400 VDC BUS CAPACITOR REMOVAL AND REPLACEMENT PROCEDURE

⚠ WARNING

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

TEST DESCRIPTION

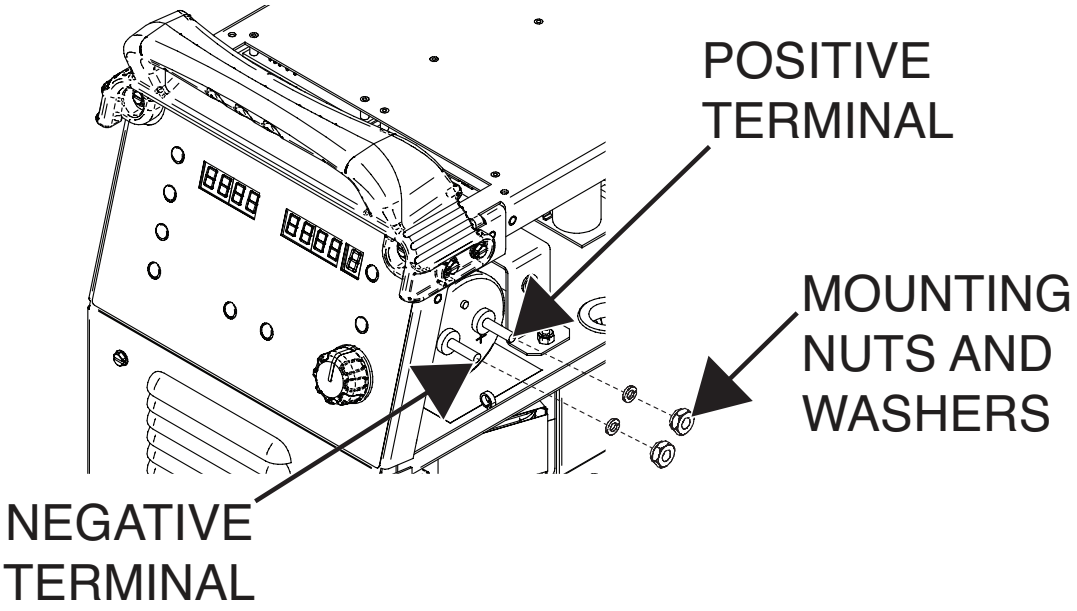
This procedure will aid the technician in the removal and replacement of the 400 VDC Bus Capacitor.

MATERIALS NEEDED

5/16” Nutdriver With Extension
Small Slotted Screwdriver
3/8” Nutdriver
Penetrox Heat Sink Compound (Lincoln Part #T12837-1)
Wiring Diagram

400 VDC BUS CAPACITOR
REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

Figure F.65 – 400 VDC capacitor terminals



REMOVAL PROCEDURE

1. Remove the input power to the Aspect 375 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Capacitor Discharge Procedure***.
4. Using a 5/16” nutdriver, remove the nut and washer securing the leads to the capacitor terminals. See Figure F.65.
5. Label and disconnect leads 344, 344A, 620 and 610 from the positive terminal of the 400 VDC bus capacitor. See Figure F.65. See Wiring Diagram.
6. Label and disconnect leads 621, 611, 346 and 346A from the negative terminal of the 400 VDC bus capacitor. See Figure F.65. See Wiring Diagram.
7. To gain access to the slotted bolt head that secures the capacitor mounting bracket, it is necessary to move the high frequency board bracket out of the way.
8. Using a 5/16” nutdriver, remove the two top screws securing the high frequency board bracket to the machine. See ***Figure F.66***.
9. Using a 5/16” nutdriver, remove the bottom bolt securing the high frequency board bracket to the machine. See ***Figure F.66***.
10. Using a small slotted screwdriver, hold the bottom slotted bolt head in place (not rotating) while removing the capacitor bracket.
11. Using a 3/8” nutdriver with an extension, remove the locknut securing the capacitor bracket. See ***Figure F.67***.
12. The 400 VDC bus capacitor can now be removed and replaced.

400 VDC BUS CAPACITOR
REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

Figure F.66 – High frequency board mounting screws

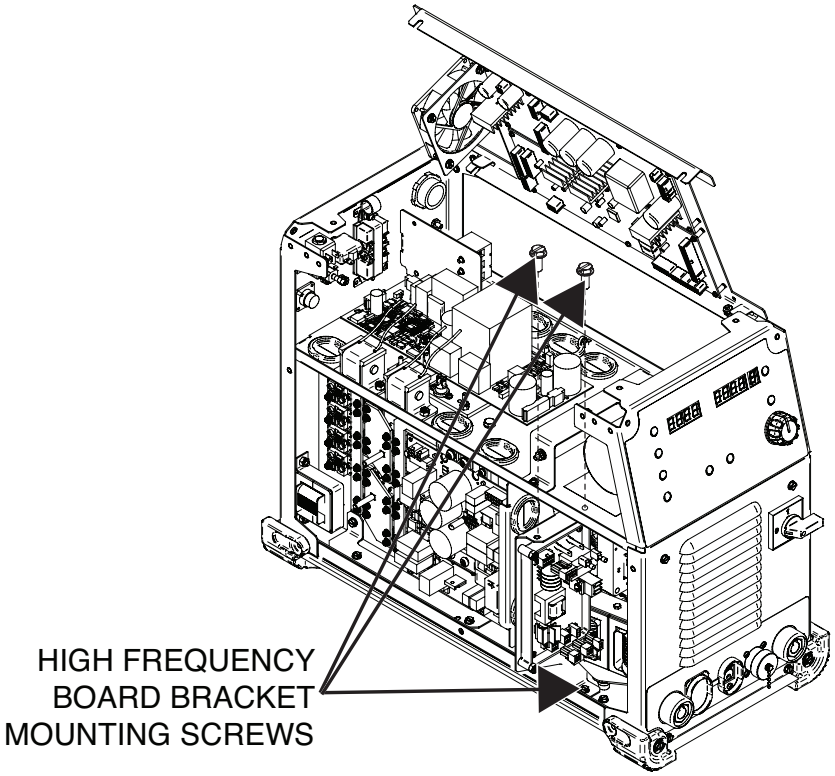
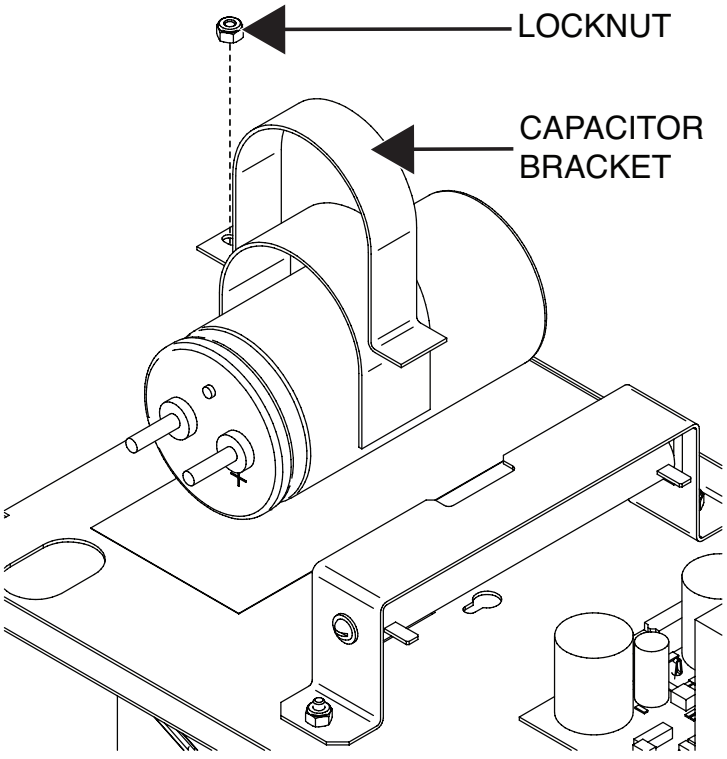


Figure F.67 – Capacitor bracket



400 VDC BUS CAPACITOR
REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

REPLACEMENT PROCEDURE

1. Apply a coating of Penetrox heat sink compound to the positive and negative terminals (studs) of the new 400 VDC bus capacitor.
2. Carefully position the new 400 VDC bus capacitor into the machine. Be sure the mylar paper is in position under the capacitor and the positive terminal is near the resistor.
3. Using a small slotted screwdriver, hold the bottom slotted bolt head in place (not rotating) while replacing the capacitor bracket.
4. Using a 3/8" nutdriver with an extension, attach the locknut securing the capacitor bracket.
5. Using a 5/16" nutdriver, attach the bottom bolt securing the high frequency board bracket to the machine.
6. Using a 5/16" nutdriver, attach the two top screws securing the high frequency board bracket to the machine.
7. Connect leads 346, 346A, 621 and 611 to the negative terminal of the 400 VDC bus capacitor. See Wiring Diagram. Torque the lead connections to 18-25 in/lbs. Keep negative leads clear of the positive leads.
8. Connect leads 344, 344A, 620 and 610 to the positive terminal of the 400 VDC bus capacitor. See Wiring Diagram. Torque the lead connections to 18-25 in/lbs. Keep positive leads clear of the negative leads.
9. Using a 5/16" nutdriver, attach the bolt and washer securing the leads to the 400 VDC capacitor.
10. Perform the ***Case Cover Replacement Procedure***.
11. Perform the ***Retest After Repair Procedure***.

OUTPUT DIODE MODULE
REMOVAL AND REPLACEMENT PROCEDURE

⚠ WARNING

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

TEST DESCRIPTION

This procedure will aid the technician in the removal and replacement of the Output Diode Module.

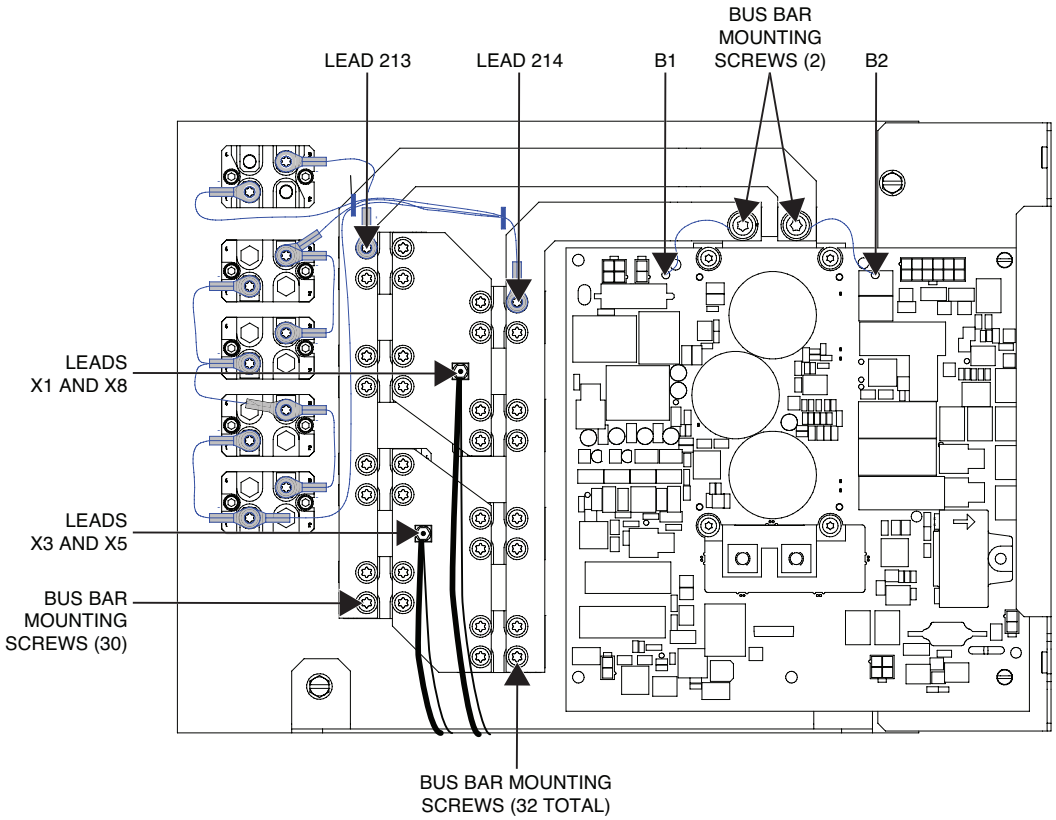
MATERIALS NEEDED

Torx Nutdriver (Size T20)
7/16” Deep Well Nutdriver
Torx Nutdriver (Size T27)
7/64” Allen Wrench
Dow Corning 340 Heat Sink Compound (Lincoln Part #T12837)
Wiring Diagram

OUTPUT DIODE MODULE

REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

Figure F.68 – Bus bar mounting screw and lead locations



REMOVAL PROCEDURE

1. Remove the input power to the Aspect 375 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Capacitor Discharge Procedure***.
4. Using a Torx nutdriver (size T20), label and remove leads 214 and 213 and associated washers from the top output diode modules. See Figure F.68. See Wiring Diagram. Note washer placement for reassembly.
5. Using a 7/16” deepwell nutdriver, remove the nut and washer securing leads X1 and X8 to the bus bar. Label and remove leads X1 and X8. See Figure F.68. See Wiring Diagram. Note washer placement for reassembly.
6. Using a 7/16” deepwell nutdriver, remove the nut and washer securing leads X3 and X5 to the bus bar. Label and remove leads X3 and X5. See Figure F.68. See Wiring Diagram. Note washer placement for reassembly.
7. Using a Torx nutdriver (size T27), remove the two bus bar mounting screws and washers (located at the top of the output board) securing leads B1 and B2 from the output board. See Figure F.68. See Wiring Diagram. Note washer placement for reassembly.
8. Using a Torx nutdriver (size T20), remove the thirty remaining screws and washers securing the bus bars to the output diode modules. See Figure F.68.

NOTE: There are thirty-two bus bar mounting screws total, two have been previously removed.

9. Carefully remove the bus bars to gain access to the output diode modules.

NOTE: It may not be necessary to remove all four bus bars in order to access the module to be replaced.

10. Using a 7/64” allen wrench, remove the two mounting screws and associated washers securing the desired module to the machine. See ***Figure F.69***. Note orientation of the module for reassembly.

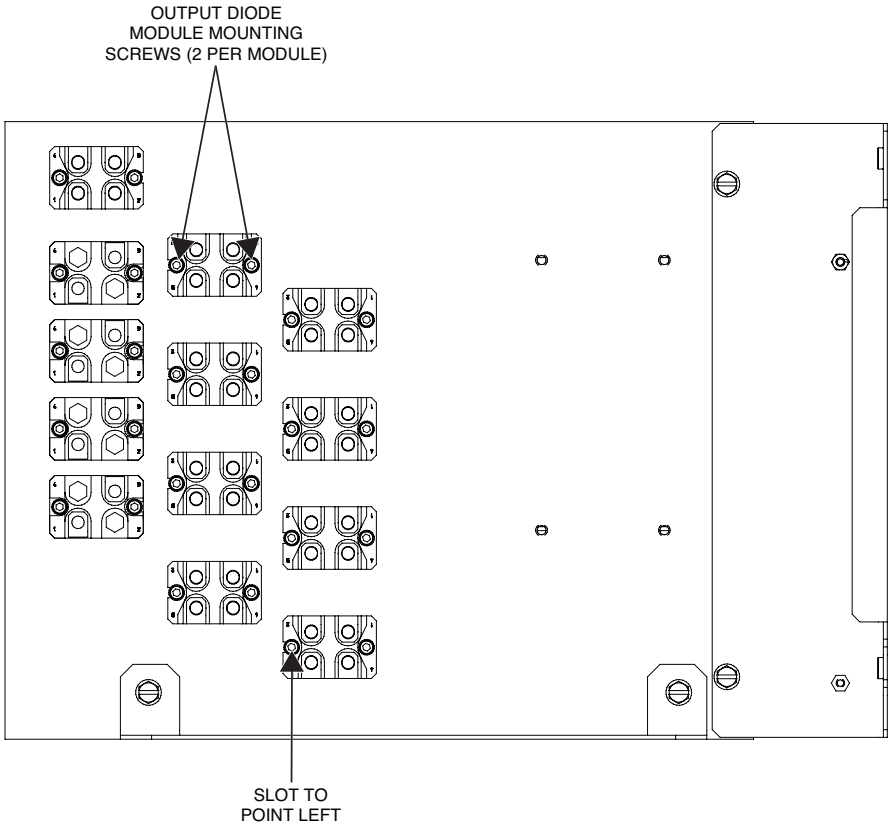
NOTE: There are eight output diode modules total, only replace modules that have tested faulty.

11. The output diode module(s) can now be removed and replaced.

OUTPUT DIODE MODULE

REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

Figure F.69 – Output diode module orientation and mounting screw locations



REPLACEMENT PROCEDURE

1. Clean the heat sink mating surface.
2. Apply a coating of Dow Corning 340 heat sink compound to the output diode module mating surface.
3. Carefully position the new output diode module into the machine.

NOTE: Output diode modules must be positioned with the slot to the left (rear of the machine). See Figure F.69.

4. Using a 7/64" allen wrench, attach the two mounting screws and associated washers securing the output diode module to the machine. Repeat for all modules being replaced. Torque the mounting screws to 11-13 in/lbs.
5. Carefully position the bus bars into the machine.
6. Using a Torx nutdriver (size T20), attach the thirty mounting screws and washers securing the bus bars to the output diode modules. Torque the mounting screws to 11-13 in/lbs.
7. Using a Torx nutdriver (size T27), attach the two bus bar mounting screws and washers (located at the top of the output board) securing leads B1 and B2 to the output board. See Wiring Diagram. Torque the mounting screws to 40-45 in/lbs.
8. Using a 7/16" deepwell nutdriver, attach the nut and washer securing leads X3 and X5 to the bus bar. See Wiring Diagram.
9. Using a 7/16" deepwell nutdriver, attach the nut and washer securing leads X1 and X8 to the bus bar. See Wiring Diagram.
10. Using a Torx nutdriver (size T20), attach leads 214 and 213 and associated washers to the top output diode modules. See Wiring Diagram. Torque the mounting screws to 11-13 in/lbs.
11. Perform the ***Case Cover Replacement Procedure***.
12. Perform the ***Retest After Repair Procedure***.

DISCHARGE POWER RESISTOR'S REMOVAL AND REPLACEMENT PROCEDURE

⚠ WARNING

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

TEST DESCRIPTION

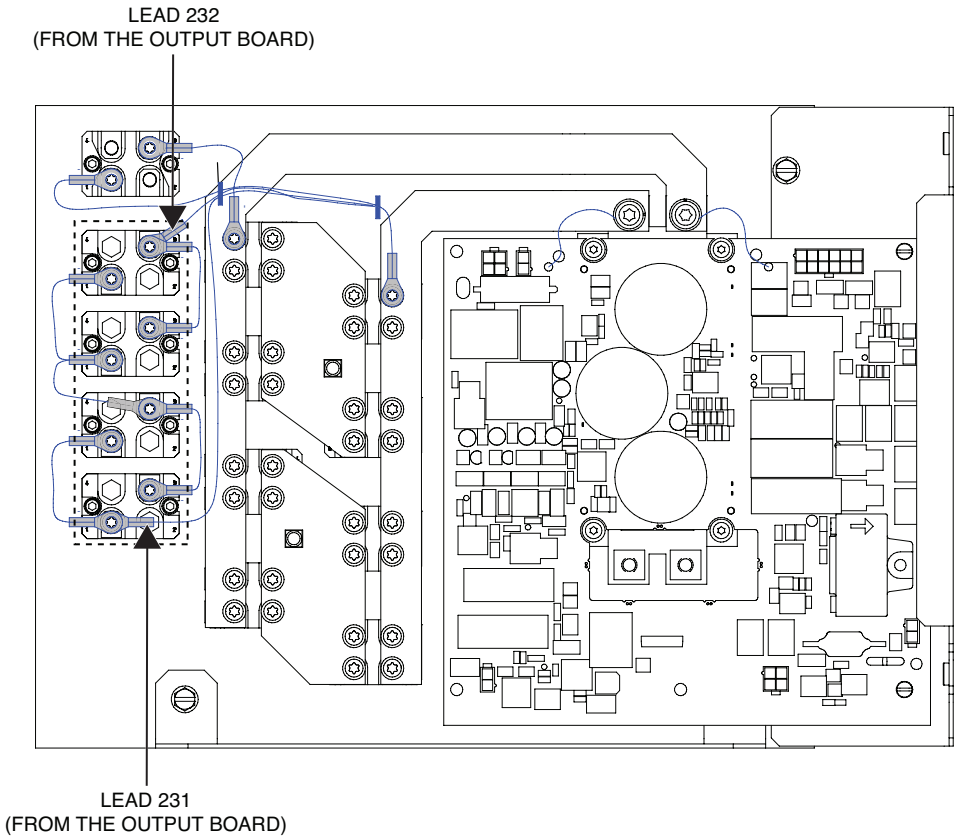
This procedure will aid the technician in the removal and replacement of the Discharge Power Resistor's.

MATERIALS NEEDED

Torx Nutdriver (Size T20)
7/64" Allen Wrench
Dow Corning 340 Heat Sink Compound (Lincoln Part #T12837)
Wiring Diagram

DISCHARGE POWER RESISTOR'S
REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

Figure F.70 – Discharge power resistor lead locations and orientation

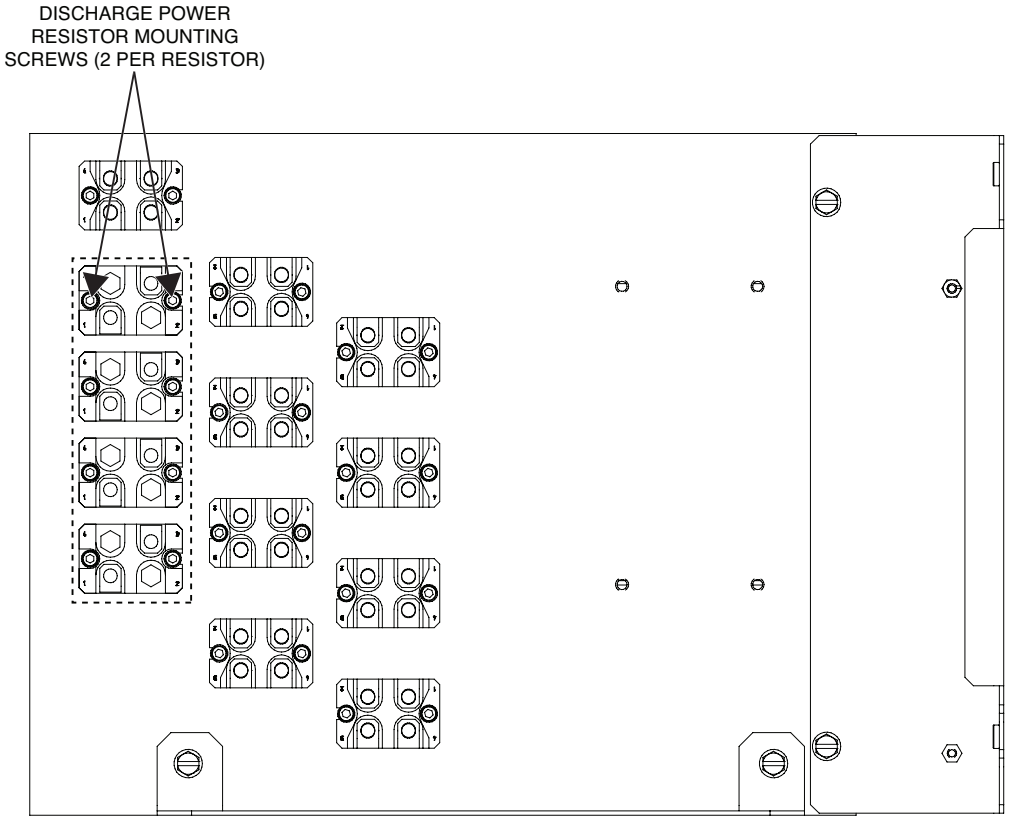


REMOVAL PROCEDURE

1. Remove the input power to the Aspect 375 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Capacitor Discharge Procedure***.
4. Using a Torx nutdriver (size T20), label and disconnect the eight screws securing the leads 231 and 232 to the discharge power resistors. Label and disconnect leads. See Figure F.70. See Wiring Diagram. Note lead orientation for reassembly.
5. Using a 7/64" allen wrench, remove the two screws securing the discharge power resistor to the machine (four resistors, eight screws total). See ***Figure F.71***. Only replace resistors that have tested faulty.
6. The discharge power resistor(s) can now be removed and replaced.

DISCHARGE POWER RESISTOR'S
REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

Figure F.71 – Discharge power resistor mounting screw locations



REPLACEMENT PROCEDURE

1. Clean the heat sink mating surface.
2. Apply a coating of Dow Corning 340 heat sink compound to the discharge power resistor(s) mating surface.
3. Carefully position the new discharge power resistor(s) into the machine.
4. Using a 7/64" allen wrench, attach the two screws securing the discharge power resistor(s) to the machine.
5. Using a Torx nutdriver (Size T20), connect the eight screws securing leads 231 and 232 to the discharge power resistors. See Wiring Diagram. Torque lead connections to 11-13 in/lbs.
6. Perform the ***Case Cover Replacement Procedure***.
7. Perform the ***Retest After Repair Procedure***.

VOLTAGE DOUBLER RECTIFIER REMOVAL AND REPLACEMENT PROCEDURE

⚠ WARNING

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

TEST DESCRIPTION

This procedure will aid the technician in the removal and replacement of the Voltage Doubler Rectifier.

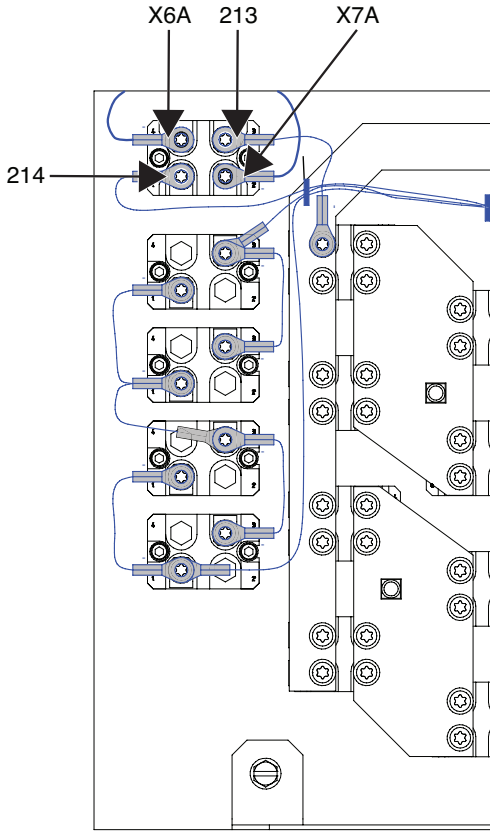
MATERIALS NEEDED

Torx Nutdriver (Size T20)
7/64” Allen Wrench
Dow Corning 340 Heat Sink Compound (Lincoln Part #T12837)
Wiring Diagram

VOLTAGE DOUBLER RECTIFIER

REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

Figure F.72 – Voltage doubler rectifier lead connections



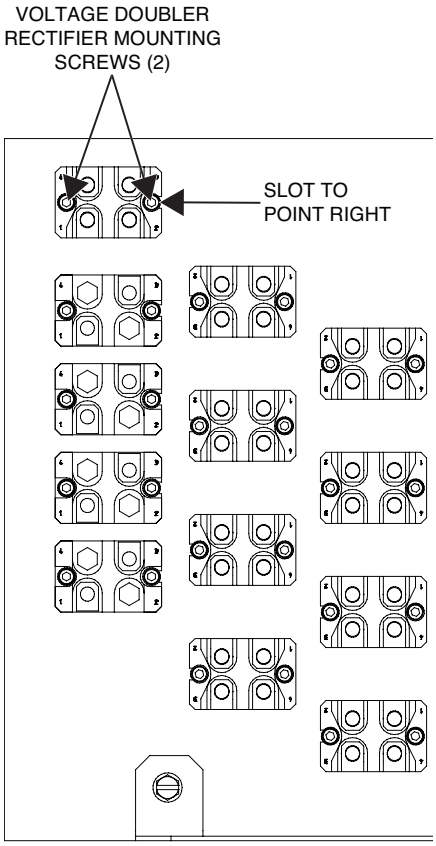
REMOVAL PROCEDURE

1. Remove the input power to the Aspect 375 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Capacitor Discharge Procedure***.
4. Using a Torx nutdriver (size T20), label and disconnect the screws securing leads 213, 214, X6A and X7A to the voltage doubler rectifier. See Figure F.72. See Wiring Diagram.
5. Using a 7/64” allen wrench, remove the two screws securing the voltage doubler rectifier to the machine. See ***Figure F.73***. Note the placement and orientation of the voltage doubler rectifier for reassembly.
6. The voltage doubler rectifier can now be removed and replaced.

VOLTAGE DOUBLER RECTIFIER

REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

Figure F.73 – Voltage doubler rectifier orientation and mounting screw locations



REPLACEMENT PROCEDURE

1. Clean the heat sink mating surface.
2. Apply a coating of Dow Corning 340 heat sink compound to the new voltage doubler rectifier mating surface.
3. Carefully position the new voltage doubler rectifier into the machine.

NOTE: The voltage doubler rectifier must be placed into the machine in the exact same position and orientation (slot to the right) as it was removed. See Figure F.73.

4. Using a 7/64" allen wrench, attach the two screws securing the voltage doubler rectifier to the machine. Torque the mounting screws to 11-13 in/lbs.
5. Using a Torx nutdriver (size T20), attach the screws securing leads 213, 214, X6A and X7A to the voltage doubler rectifier. See Wiring Diagram. Torque lead connections to 11-13 in/lbs.
6. Perform the ***Case Cover Replacement Procedure***.
7. Perform the ***Retest After Repair Procedure***.

INPUT RECTIFIER
REMOVAL AND REPLACEMENT PROCEDURE

⚠ WARNING

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

TEST DESCRIPTION

This procedure will aid the technician in the removal and replacement of the Input Rectifier.

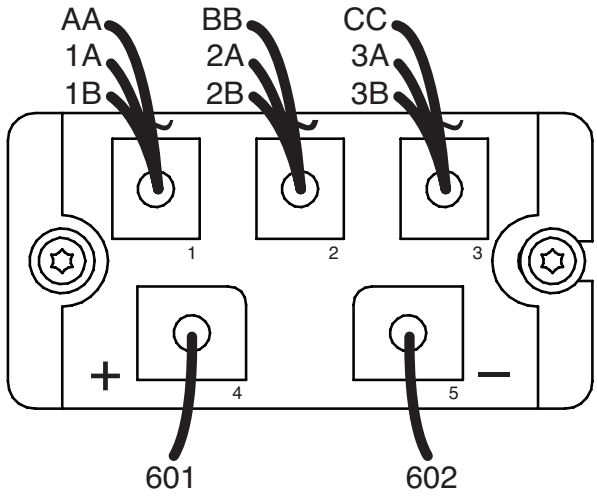
MATERIALS NEEDED

Phillips Screwdriver
Torx Nutdriver (Size T25)
Dow Corning 340 Heat Sink Compound (Lincoln Part #T12837) (Supplied With Rectifier)
Wiring Diagram

INPUT RECTIFIER

REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

Figure F.74 – Input rectifier lead locations



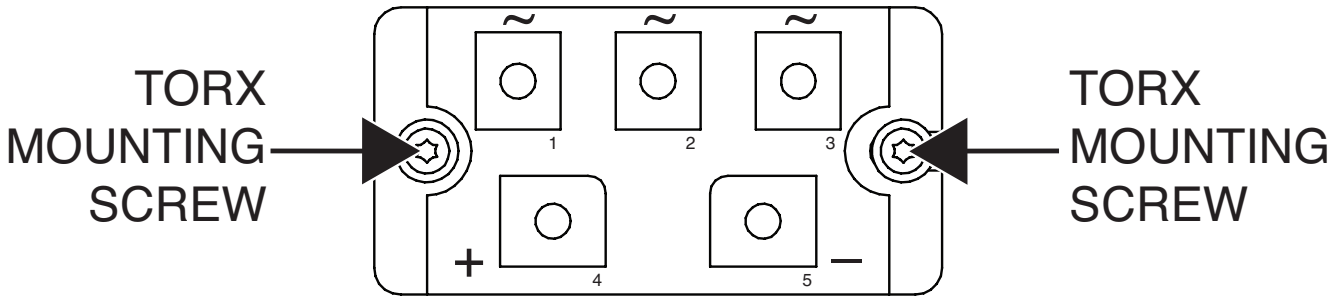
REMOVAL PROCEDURE

1. Remove the input power to the Aspect 375 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Capacitor Discharge Procedure***.
4. Using a phillips screwdriver, label and disconnect leads 601, 602, AA, 1A, 1B, BB, 2A, 2B, CC, 3A, 3B from the input rectifier. See Figure F.74. See Wiring Diagram.
5. Using a Torx nutdriver (size T25), remove the two screws securing the input rectifier to the machine. See ***Figure F.75***.
6. The input rectifier can now be removed and replaced.

INPUT RECTIFIER

REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

Figure F.75 – Input rectifier mounting screws



REPLACEMENT PROCEDURE

1. Clean the heat sink surface.
2. Apply a coating of Dow Corning 340 between the heat sink and the input rectifier.
3. Carefully position the new rectifier into the machine with the mounting slot facing the rear of the machine.
4. Using a Torx nutdriver (size T25), attach the two screws securing the input rectifier to the machine. Torque the mounting screws to 18-25 in/lbs.
5. Using a medium phillips screwdriver, connect leads 601, 602, AA, 1A, 1B, BB, 2A, 2B, CC, 3A, 3B to the input rectifier. See Wiring Diagram. Torque leads to 18-25 in/lbs allowing space between all connections.
6. Perform the ***Case Cover Replacement Procedure***.
7. Perform the ***Retest After Repair Procedure***.

GAS SOLENOID
REMOVAL AND REPLACEMENT PROCEDURE

⚠ WARNING

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

TEST DESCRIPTION

This procedure will aid the technician in the removal and replacement of the Gas Solenoid.

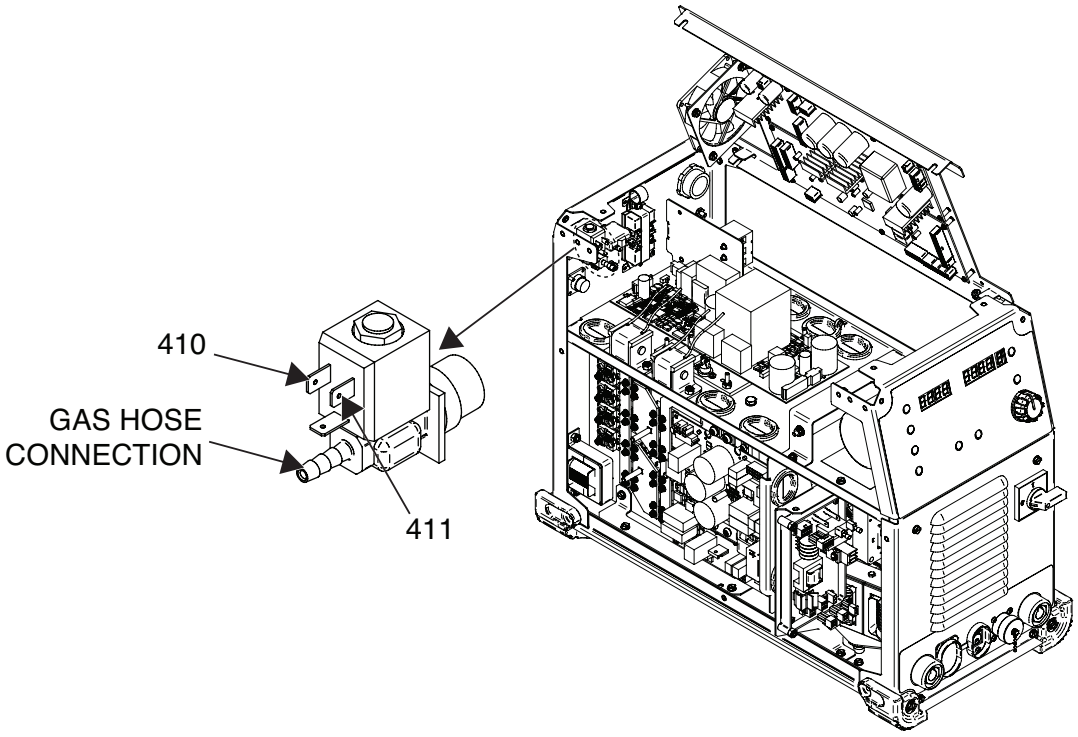
MATERIALS NEEDED

Needle Nose Pliers
Hammer
Slotted Screwdriver
Wiring Diagram

GAS SOLENOID

REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

Figure F.76 – Gas solenoid leads



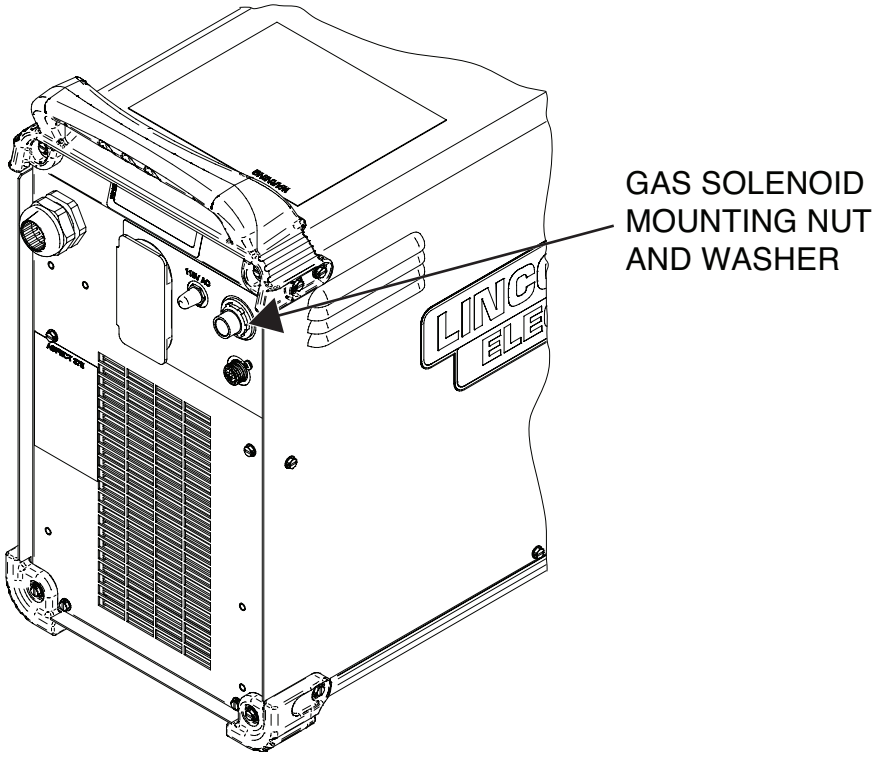
REMOVAL PROCEDURE

1. Remove the input power to the Aspect 375 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Capacitor Discharge Procedure***.
4. Label and disconnect leads 410 and 411 from the gas solenoid. Needle nose pliers may be necessary for removal. See Figure F.76. See Wiring Diagram.
5. Using needle nose pliers, compress hose clamp and disconnect gas hose from the rear of the solenoid.
6. Using a hammer and slotted screwdriver, carefully loosen nut on the back of the machine securing the gas solenoid to the case back. Note washer placement for reassembly. See ***Figure F.77***.
7. The gas solenoid can now be removed and replaced.

GAS SOLENOID

REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

Figure F.77 – Gas solenoid mounting nut



REMOVAL PROCEDURE

1. Carefully position the new gas solenoid into the case back of the machine.
2. Using a hammer and slotted screwdriver, carefully tighten nut and washer securing the gas solenoid to the case back.
3. Using needle nose pliers, compress hose clamp and connect gas hose to the back of the solenoid.
4. Connect leads 410 and 411 to the gas solenoid. Needle nose pliers may be necessary. See Wiring Diagram.
5. Perform the ***Case Cover Replacement Procedure***.

OUTPUT BOARD
REMOVAL AND REPLACEMENT PROCEDURE

⚠ WARNING

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

TEST DESCRIPTION

This procedure will aid the technician in the removal and replacement of the Output Board.

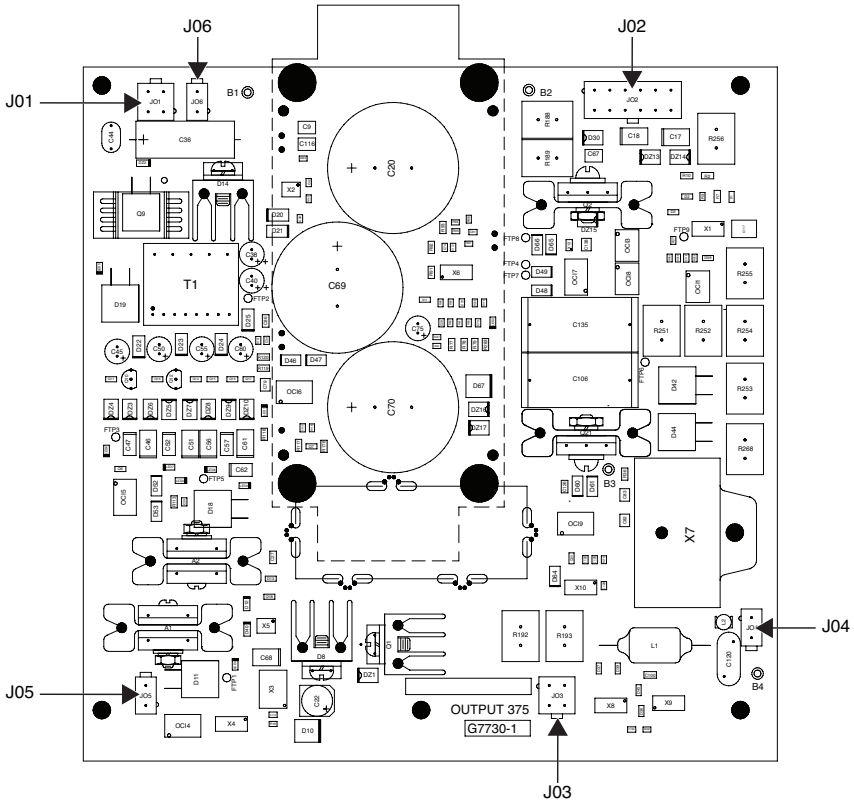
MATERIALS NEEDED

5/16” Open End Wrench
Torx Nutdriver (size T27)
7/16” Nutdriver
7/16” Open End Wrench
Torx Nutdriver (size T20)
Torx Nutdriver (size T25)
Dow Corning 340 Heat Sink Compound (Lincoln Part #T12837)
Wiring Diagram

OUTPUT BOARD

REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

Figure F.78 – Output board plug locations



REMOVAL PROCEDURE

1. Remove the input power to the Aspect 375 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Capacitor Discharge Procedure***.
4. Label and disconnect plugs J01, J02, J03, J04, J05 and J06 from the output board. See Figure F.78. See Wiring Diagram.
5. Using a 5/16” open end wrench, remove the screw securing the output board ground lead to the baffle located on the left side of the machine. See ***Figure F.79***. See Wiring Diagram.

NOTE: This screw may only need to be loosened to disconnect the ground lead.

6. Using a Torx nutdriver (size T27), label and disconnect leads B1 and B2 from the bus bars. See ***Figure F.80***. See Wiring Diagram. Note washer placement for reassembly.
7. Using a Torx nutdriver (size T27), remove the two screws securing output choke bus bar and lead B3 to the output board. See ***Figure F.79***. See Wiring Diagram.
8. Using a 7/16” nutdriver and a 7/16” open end wrench, remove the bolt, nut and washer securing the bus bar to the output choke. See ***Figure F.79***. Note washer placement for reassembly.
9. Carefully maneuver the bus bar out of the machine.
10. Using a Torx nutdriver (size T20), remove the eight screws and washers securing the bus bar and lead 214 to the output diode modules. See ***Figure F.80***. See Wiring Diagram.
11. Carefully remove the bus bar from the machine.
12. Using a Torx nutdriver (size T25), remove the four screws and washers securing the output board to the machine. See ***Figure F.80***.
13. Carefully maneuver the board toward the rear of the machine (approximately one inch) to allow clearance for the removal of the board.
14. The output board can now be removed and replaced.

NOTE: It may be necessary to move peripheral wiring to the side to remove the output board.

OUTPUT BOARD

REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

Figure F.79 – Output choke bus bar removal

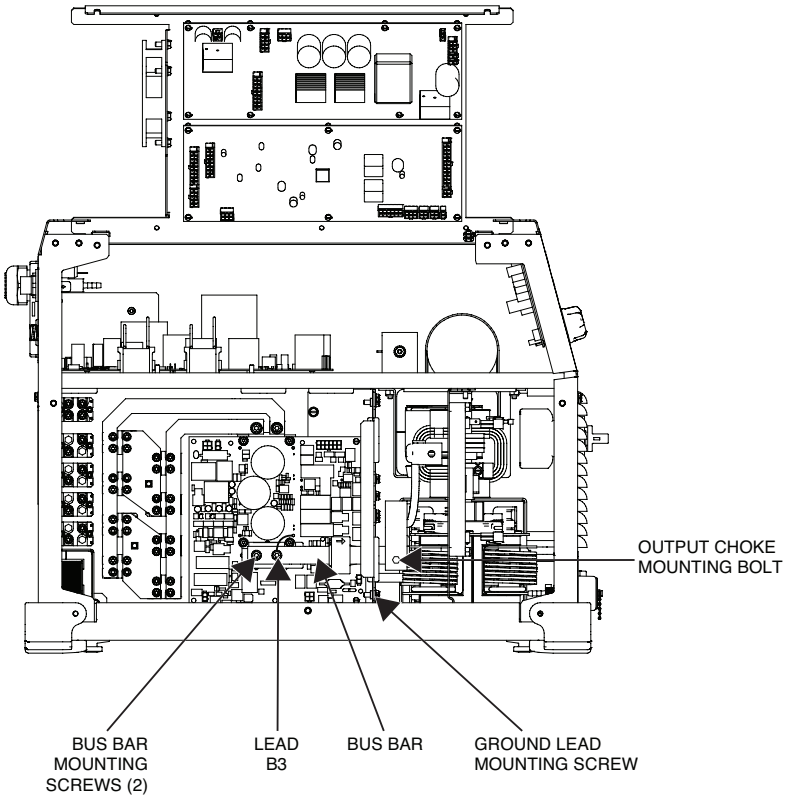
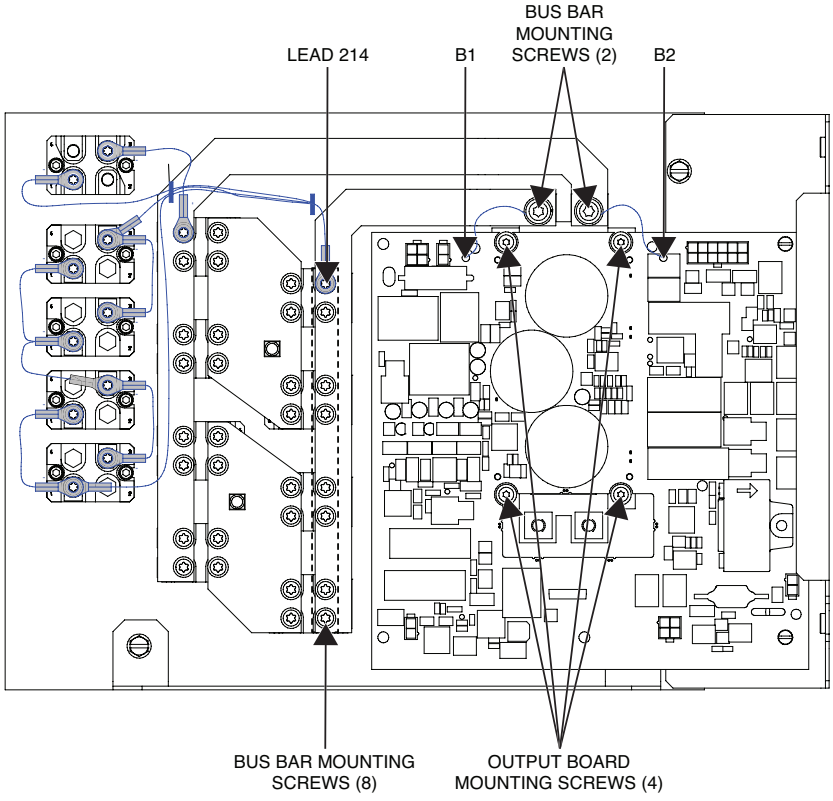


Figure F.80 – Output board mounting screws and bus bar removal



OUTPUT BOARD
REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

REPLACEMENT PROCEDURE

1. Clean the heat sink mating surface.
2. Apply a coating of Dow Corning 340 heat sink compound to the output board mating surface.
3. Carefully position the new output board into the machine.
4. Using a Torx nutdriver (size T25), attach the four screws and washers securing the output board to the machine. Torque the mounting screws to 25 in/lbs.
5. Carefully position the bus bar into the machine.
6. Using a Torx nutdriver (size T20), attach the eight screws and washers securing the bus bar and lead 214 to the output diode modules. See Wiring Diagram.
7. Carefully position the bus bar thru the current transducer into the machine.
8. Using a 7/16" nutdriver and a 7/16" open end wrench, attach the bolt, nut and washer securing the bus bar to the output choke.
9. Using a Torx nutdriver (size T27), attach the two screws securing output choke bus bar and lead B3 to the output board. See Wiring Diagram.
10. Using a Torx nutdriver (size T27), connect leads B1 and B2 and associated washers to the bus bars. See Wiring Diagram.
11. Using a 5/16" open end wrench, attach the screw securing the output board ground lead to the baffle located on the left side of the machine. See Wiring Diagram.
12. Connect plugs J01, J02, J03, J04, J05 and J06 to the output board. See Wiring Diagram.
13. Perform the ***Case Cover Replacement Procedure***.
14. Perform the ***Retest After Repair Procedure***.

BUCK/BOOST BOARD
REMOVAL AND REPLACEMENT PROCEDURE

⚠ WARNING

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

TEST DESCRIPTION

This procedure will aid the technician in the removal and replacement of the Buck/Boost Board.

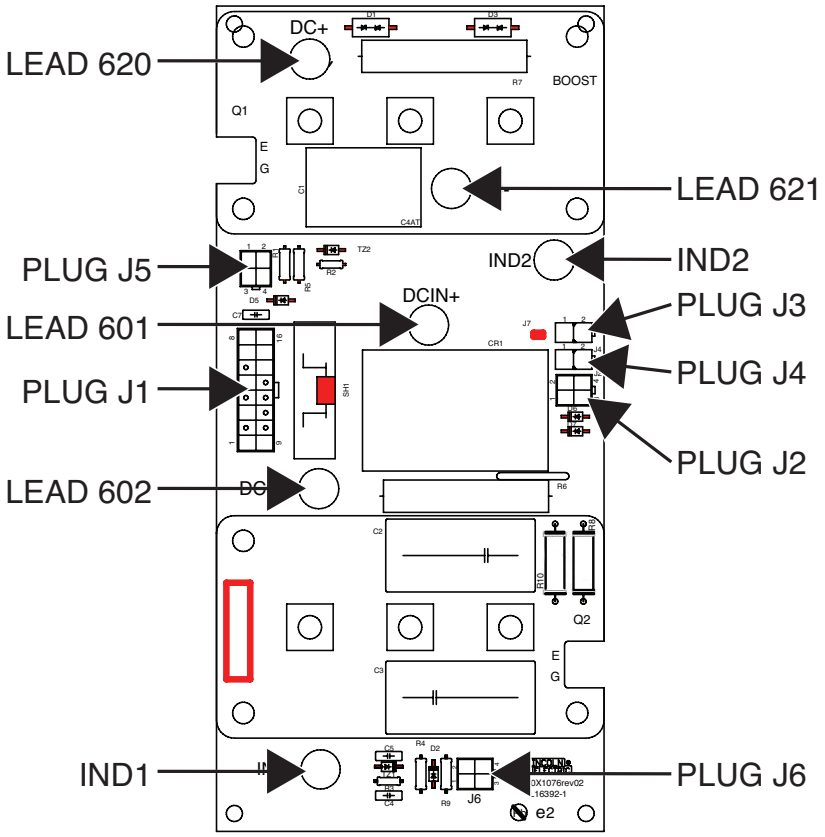
MATERIALS NEEDED

Torx Nutdriver (Size T20)
Phillips Screwdriver
Wiring Diagram

BUCK/BOOST BOARD

REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

Figure F.81 – Buck/boost board leads and plugs



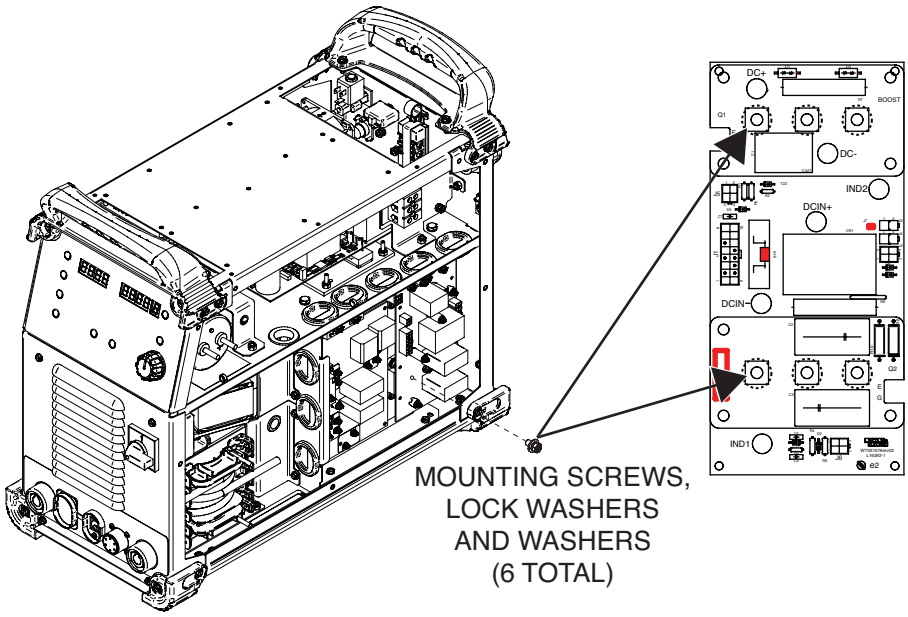
REMOVAL PROCEDURE

1. Remove the input power to the Aspect 375 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Capacitor Discharge Procedure***.
4. Using a Torx nutdriver (size T20), disconnect the six screws, lockwashers and washers securing the leads to the buck/boost board. Label and disconnect leads 601, 602, 621, 620, IND1, IND2 from the buck/boost board. See Figure F.81. See Wiring Diagram.
5. Label and disconnect plugs J1, J2, J3, J4, J5 and J6 from the buck/boost board. See Figure F.81. See Wiring Diagram.
6. Using a phillips screwdriver, remove the six screws securing the buck/boost board to the machine. See ***Figure F.82***.
7. The buck/boost board can now be removed and replaced.

BUCK/BOOST BOARD

REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

Figure F.82 – Buck/boost board mounting screw locations



REPLACEMENT PROCEDURE

1. Carefully position the new buck/boost board into the machine.
2. Using a phillips screwdriver, attach the six screws, lock washers and washers securing the buck/boost board to the machine. Torque screws to 18-25 in/lbs.
3. Using a Torx nutdriver (size T20), connect the six screws securing leads 601, 602, 621, 620, IND1 and IND2 to the buck/boost board. See Wiring Diagram. Torque lead connections to 11-13 in/lbs.
4. Connect plugs J1, J2, J3, J4, J5 and J6 to the buck/boost board. See Wiring Diagram.
5. Perform the ***Case Cover Replacement Procedure***.
6. Perform the ***Retest After Repair Procedure***.

BUCK & BOOST PTC THERMISTORS REMOVAL AND REPLACEMENT PROCEDURE

⚠ WARNING

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

TEST DESCRIPTION

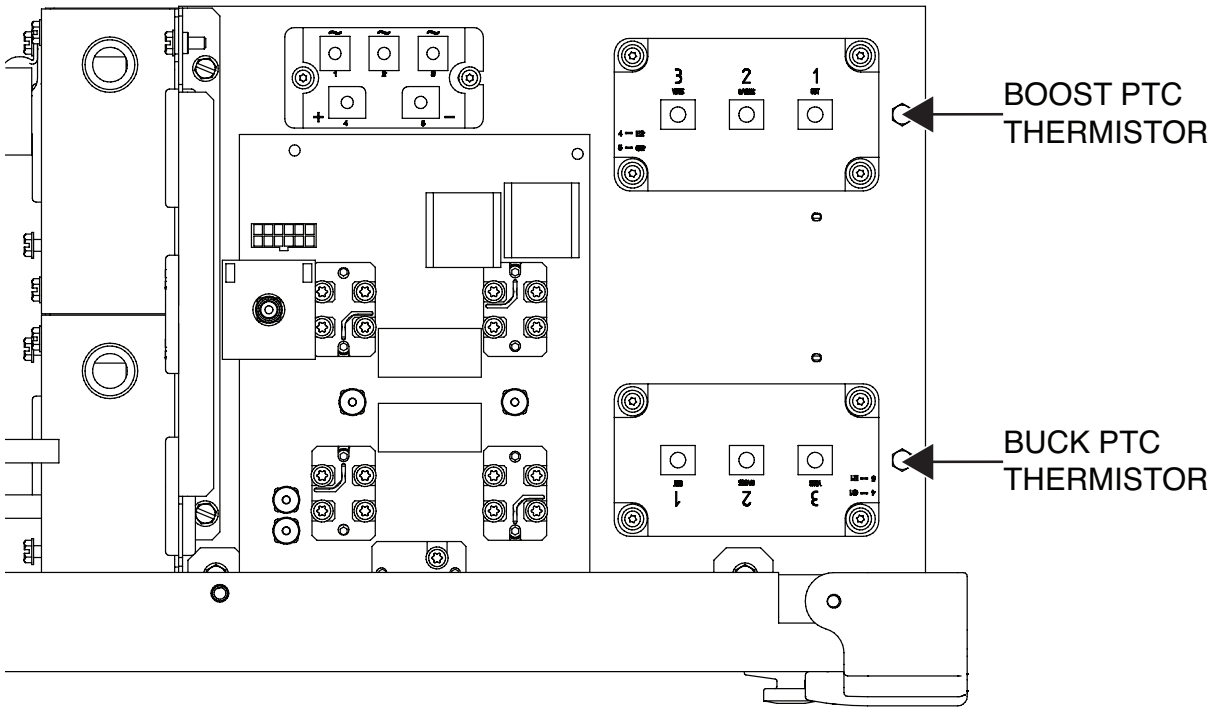
This procedure will aid the technician in the removal and replacement of the Buck & Boost PTC Thermistors.

MATERIALS NEEDED

5/16” Open End Wrench
Dow Corning 340 Heat Sink Compound (Lincoln Part #T12837)
Wiring Diagram

BUCK & BOOST PTC THERMISTORS
REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

Figure F.83 – Buck & Boost PTC thermistor replacement



REMOVAL PROCEDURE

1. Remove the input power to the Aspect 375 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Capacitor Discharge Procedure***.
4. Perform the ***Buck/Boost Board Removal Procedure***.
5. Using a 5/16” open end wrench, remove the PTC thermistor from the machine. See Figure F.83. See Wiring Diagram.
6. Repeat the previous step for the other PTC thermistor if necessary.
7. The Buck and/or Boost PTC thermistor can now be removed and replaced.

BUCK & BOOST PTC THERMISTORS
REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

REPLACEMENT PROCEDURE

1. Apply a small amount of Dow Corning 340 heat sink compound to the PTC thermistor.
2. Carefully position the new PTC thermistor into the machine and tighten by hand.
3. Using a 5/16” open end wrench, secure the PTC thermistor to the machine. See Wiring Diagram.
4. Perform the ***Buck/Boost Board Replacement Procedure***.
5. Perform the ***Case Cover Replacement Procedure***.
6. Perform the ***Retest After Repair Procedure***.

BUCK AND BOOST MODULE
REMOVAL AND REPLACEMENT PROCEDURE

⚠ WARNING

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

TEST DESCRIPTION

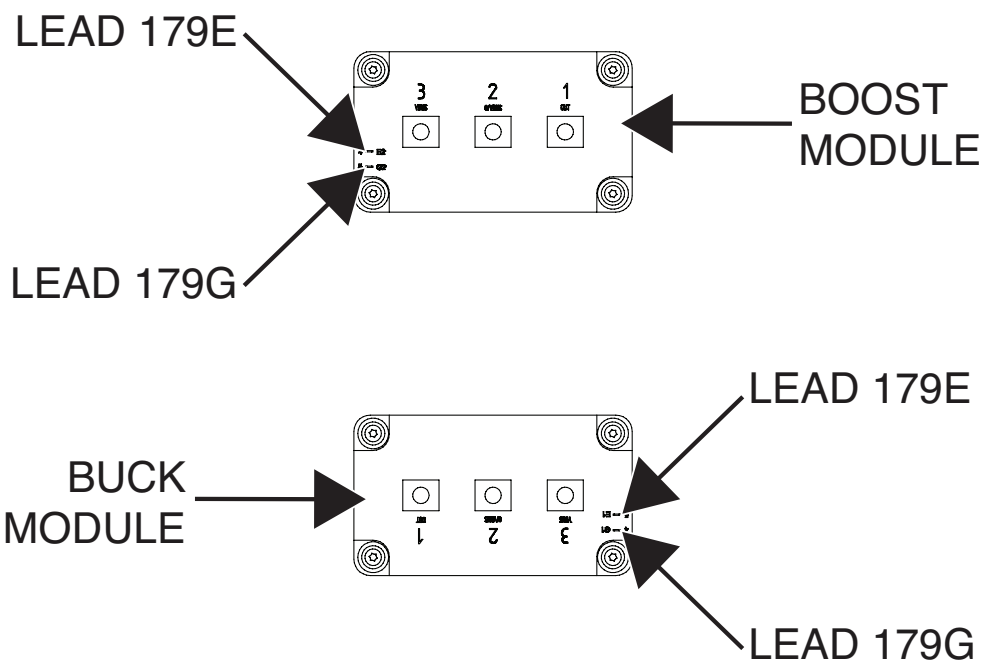
This procedure will aid the technician in the removal and replacement of the Buck and Boost Module(s).

MATERIALS NEEDED

Torx Nutdriver (Size T20)
Dow Corning 340 Heat Sink Compound (Lincoln Part #T12837)
Wiring Diagram

BUCK AND BOOST MODULE
REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

Figure F.84 – Buck and boost module lead locations



REMOVAL PROCEDURE

1. Remove the input power to the Aspect 375 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Capacitor Discharge Procedure***.
4. Perform the ***Buck/Boost Board Removal Procedure***.
5. Label and disconnect leads 179E and 179G from the buck and/or boost module(s) to be removed. See Figure F.84. See Wiring Diagram.
6. Using a Torx nutdriver (size T20), remove the four screws securing the module to be removed. See ***Figure F.85***.

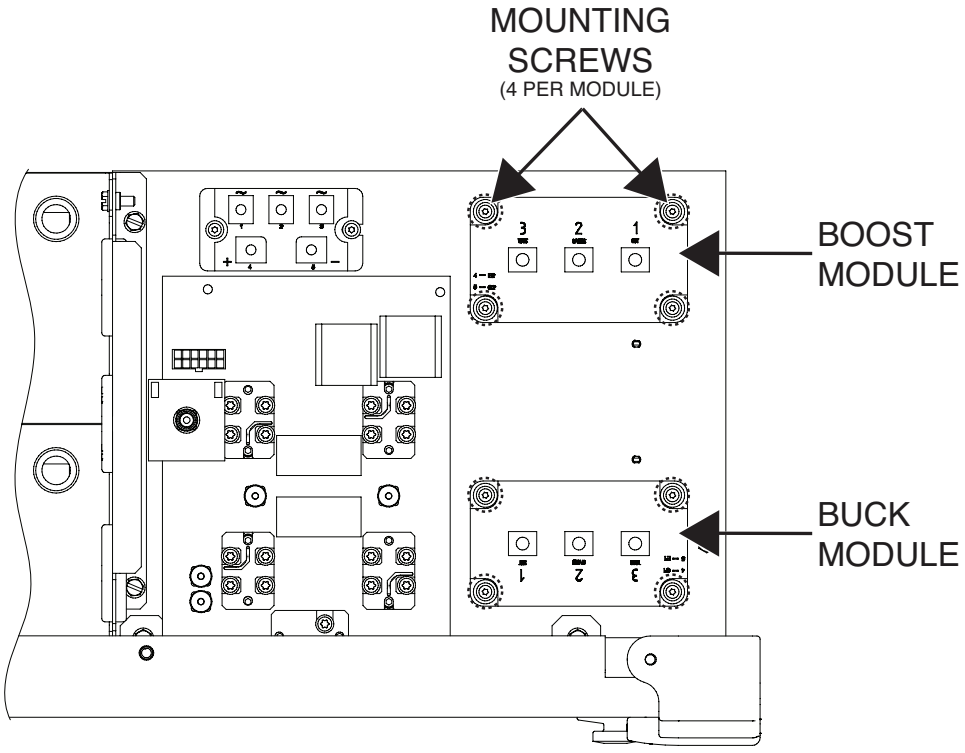
NOTE: Each module has four screws (eight screws total).

7. The buck and/or boost modules can now be removed. Note the position and orientation of the module(s) being removed. The module must be replaced in the same position and orientation. The modules have different part numbers and functions but look very similar.

BUCK AND BOOST MODULE

REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

Figure F.85 – Buck and boost module mounting screw locations



REPLACEMENT PROCEDURE

1. Clean the mating surface before positioning the new module(s) into the machine.
2. Apply a coating of Dow Corning 340 heat sink compound between the heat sink and module(s).
3. Carefully position the new module(s) into the machine.
4. Using a Torx nutdriver (size T20), attach the four screws (eight total if attaching both modules) securing the module(s) to the machine. Torque the mounting screws to 18-25 in/lbs.

NOTE: Both modules look the same but have different functions and part numbers. Verify that the proper module has been installed in the correct location. See Wiring Diagram.

5. Perform the ***Buck/Boost Board Replacement Procedure***.
6. Perform the ***Case Cover Replacement Procedure***.
7. Perform the ***Retest After Repair Procedure***.

INVERTER BOARD
REMOVAL AND REPLACEMENT PROCEDURE

⚠ WARNING

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

TEST DESCRIPTION

This procedure will aid the technician in the removal and replacement of the Inverter Board.

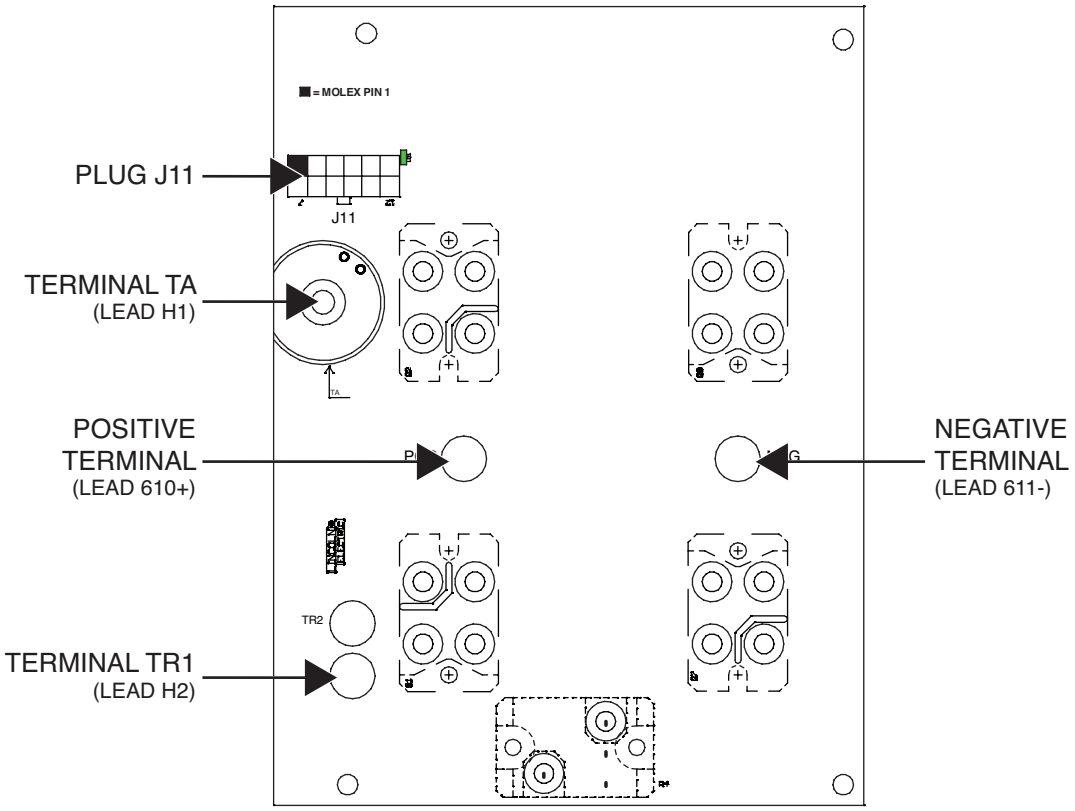
MATERIALS NEEDED

Torx Nutdriver (Size T20)
Phillips Screwdriver
Wiring Diagram

INVERTER BOARD

REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

Figure F.86 – Inverter board lead and plug locations



REMOVAL PROCEDURE

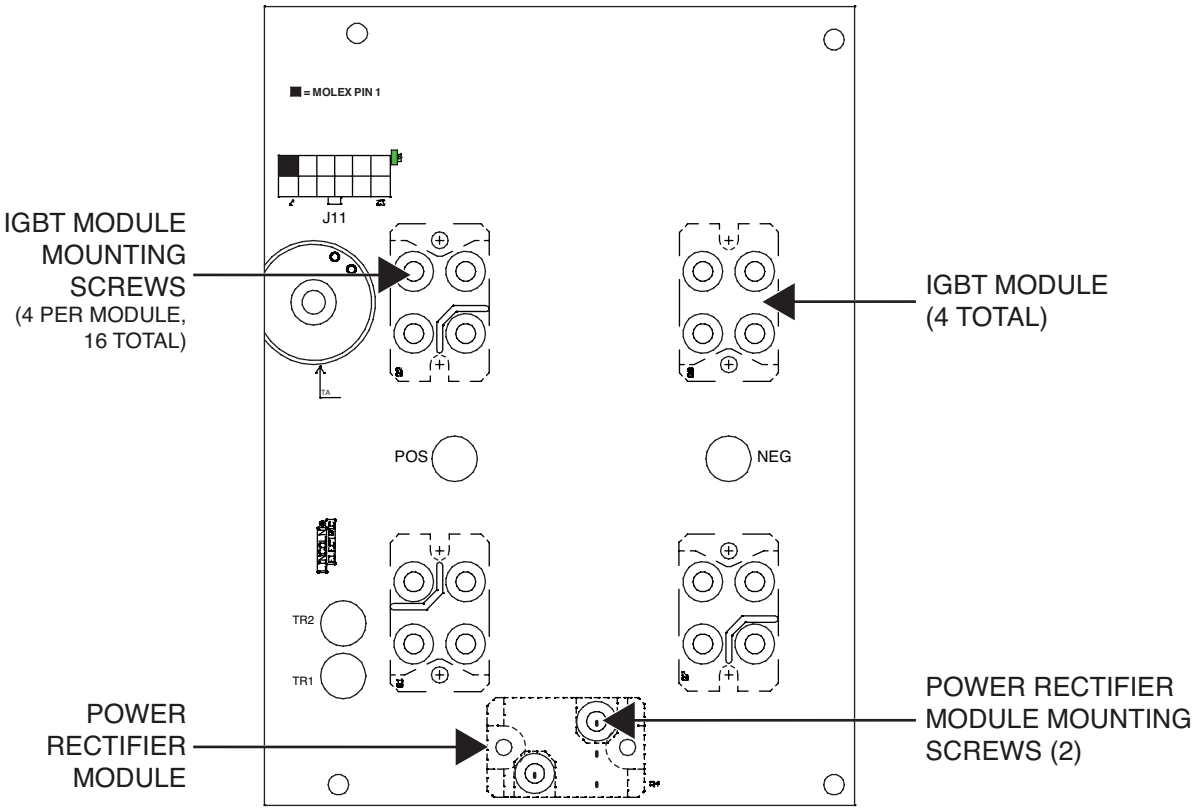
1. Remove the input power to the Aspect 375 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Capacitor Discharge Procedure***.
4. Using a Torx nutdriver (size T20), label and disconnect lead H2 from terminal TR1. See Figure F.86. See Wiring Diagram. Note washer placement for reassembly.
5. Using a Torx nutdriver (size T20), label and disconnect lead H1 from terminal TA. See Figure F.86. See Wiring Diagram. Note washer placement for reassembly.
6. Using a Torx nutdriver (size T20), label and disconnect leads 610(+) and 611(-) from the inverter board. See Figure F.86. See Wiring Diagram. Note washer placement for reassembly.
7. Label and disconnect plug J11 from the inverter board. See Figure F.86. See Wiring Diagram.
8. Using a Torx nutdriver (size T20), remove the sixteen screws securing the inverter board to the IGBT modules. See ***Figure F.87***. See Wiring Diagram. Note washer placement for reassembly.
9. Using a phillips screwdriver, remove the two screws securing the inverter board to the power rectifier modules. See ***Figure F.87***. Note washer placement for reassembly.
10. The inverter board can now be removed and replaced.

NOTE: Some wires may need to moved out of the way to allow for the removal of the inverter board.

INVERTER BOARD

REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

Figure F.87 – Inverter board mounting screws



REPLACEMENT PROCEDURE

1. Carefully position the new inverter board into the machine.
2. Using a phillips screwdriver, attach the two screws and washers securing the inverter board to the power rectifier modules.
3. Using a Torx nutdriver (size T20), attach the sixteen screws and associated washers securing the inverter board to the IGBT modules.
4. Connect plug J11 to the inverter board. See Wiring Diagram.
5. Using a Torx nutdriver (size T20), connect leads 610(+), 611(-) and associated washers to the inverter board. See Wiring Diagram.
6. Using a Torx nutdriver (size T20), connect lead H1 and associated washer to terminal TA. See Wiring Diagram.
7. Using a Torx nutdriver (size T20), connect lead H2 and associated washer to terminal TR1. See Wiring Diagram.
8. Perform the ***Case Cover Replacement Procedure***.
9. Perform the ***Retest After Repair Procedure***.

INVERTER IGBT'S AND POWER RECTIFIER REMOVAL AND REPLACEMENT PROCEDURE

⚠ WARNING

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

TEST DESCRIPTION

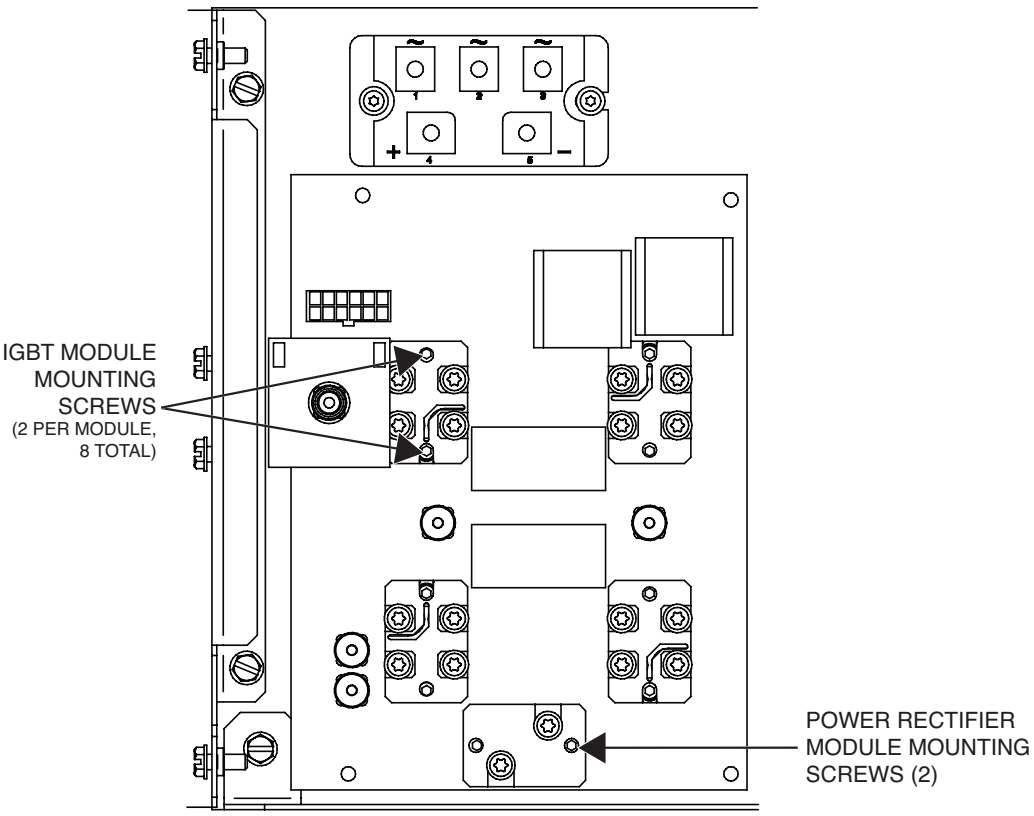
This procedure will aid the technician in the removal and replacement of the Inverter IGBTs and Power Rectifier Module.

MATERIALS NEEDED

7/64" Allen Wrench
Dow Corning 340 Heat Sink Compound (Lincoln Part #T12837)
Wiring Diagram

INVERTER IGBT'S AND POWER RECTIFIER REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

Figure F.88 – Mounting screw locations



REMOVAL PROCEDURE

1. Remove the input power to the Aspect 375 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Capacitor Discharge Procedure***.
4. Perform the ***Inverter Board Removal Procedure***.
5. Using a 7/64" allen wrench, remove the two screws securing the desired inverter IGBT(s) to the machine (four modules and eight screws total). See Figure F.88.

NOTE: The orientation of the inverter IGBTs must match ***Figure F.89***.

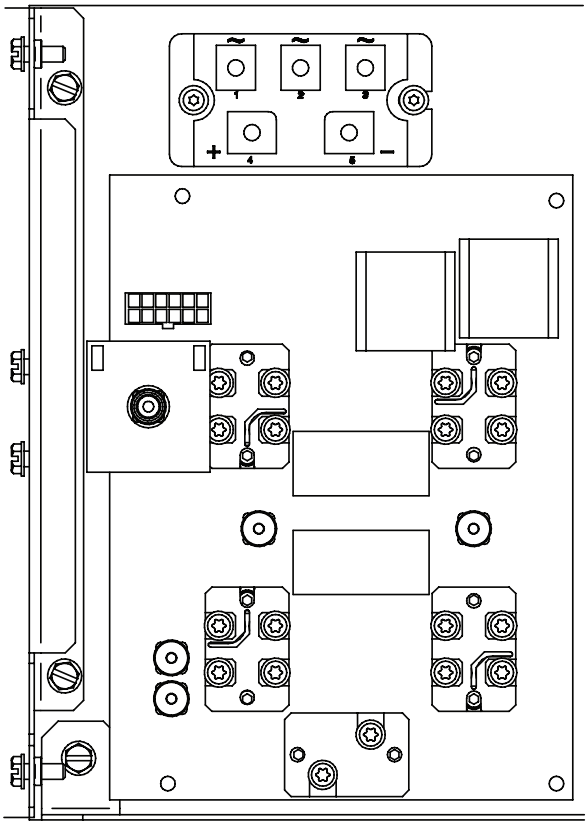
6. Using a 7/64" allen wrench, remove the two screws securing the power rectifier to the machine. See Figure F.88.

NOTE: The orientation of the power rectifier module must match ***Figure F.89***.

7. The inverter IGBTs and the power rectifier module can now be removed and replaced.

INVERTER IGBT'S AND POWER RECTIFIER REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

Figure F.89 – Module orientation



REPLACEMENT PROCEDURE

1. Clean the heat sink mating surface.
2. Apply a coating of Dow Corning 340 heat sink compound between the heat sink, the inverter IGBTs and the power rectifier.
3. Carefully position the new inverter IGBT's and/or power rectifier module into the machine.

NOTE: The orientation of the power rectifier modules must match Figure F.89.

4. Using a 7/64" allen wrench, attach the two screws securing the power rectifier to the machine. Torque mounting screws to 11-13 in/lbs.
5. Carefully position the new inverter IGBTs into the machine.

NOTE: The orientation of the inverter IGBTs must match Figure F.89.

6. Using a 7/64" allen wrench, attach the two screws securing each of the four inverter IGBTs to the machine (eight total screws). Torque mounting screws to 11-13 in/lbs.
7. Perform the ***Inverter Board Replacement Procedure***.
8. Perform the ***Case Cover Replacement Procedure***.
9. Perform the ***Retest After Repair Procedure***.

INPUT CONTROL BOARD
REMOVAL AND REPLACEMENT PROCEDURE

⚠ WARNING

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

TEST DESCRIPTION

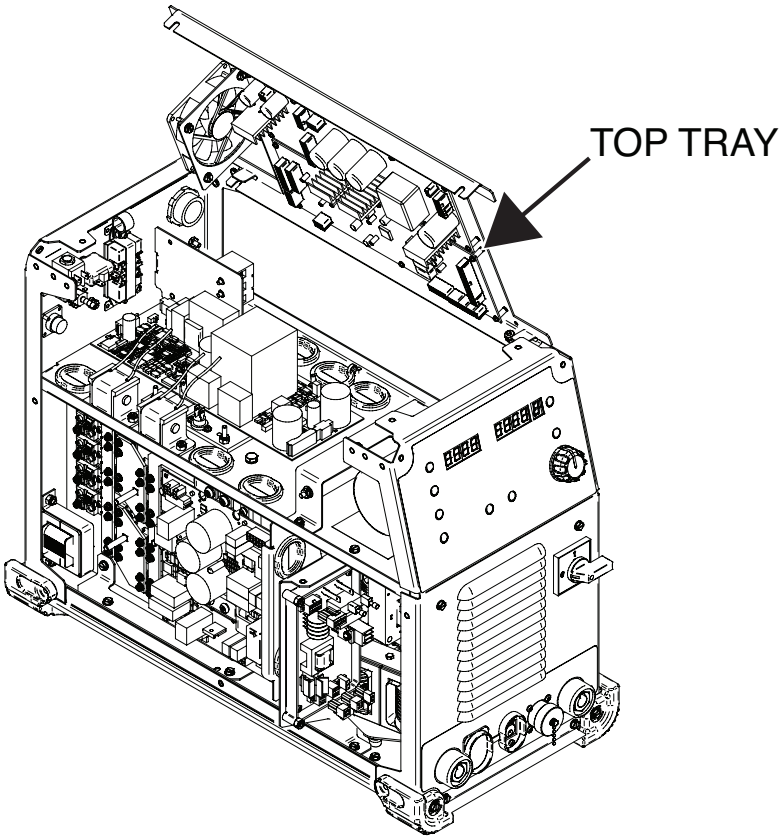
This procedure will aid the technician in the removal and replacement of the Input Control Board.

MATERIALS NEEDED

Phillips Screwdriver
Wiring Diagram

INPUT CONTROL BOARD
REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

Figure F.90 – Top tray location



REMOVAL PROCEDURE

1. Remove the input power to the Aspect 375 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Capacitor Discharge Procedure***.
4. Carefully maneuver the top tray into the upright position by tilting the top tray up and to the right. A non conductive brace will need to be used to hold the top tray in the upright position. See Figure F.90.

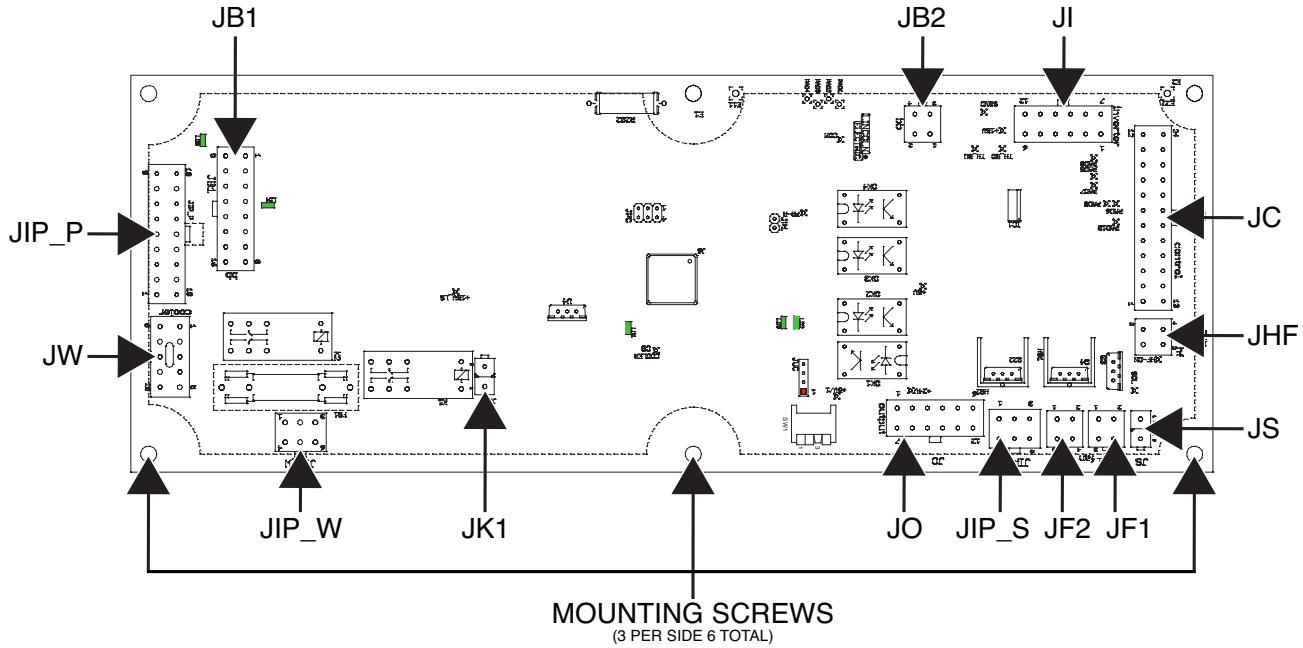
NOTE: It may be necessary to label and disconnect some plugs from the input power board to place the top tray into the upright position. See Wiring Diagram.

5. Label and disconnect plugs JIP_W, JIP_S, JIP_P, JHF, JS, JK1, JW, JC, JB1, JB2, JF1, JF2, J1 and J0 from the input control board. See ***Figure F.91***. See Wiring Diagram.
6. Using a phillips screwdriver, remove the six mounting screws and washers securing the input power control board to the machine. See ***Figure F.91***.
7. The input power control board can now be removed and replaced.

INPUT CONTROL BOARD

REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

Figure F.91 – Input control board plug locations



REPLACEMENT PROCEDURE

1. Carefully position the new input power control board into the machine.
2. Using a phillips screwdriver, attach the six mounting screws and washers securing the input power control board to the machine.
3. Connect plugs JIP_W, JIP_S, JIP_P, JHF, JS, JK1, JW, JC, JB1, JB2, JF1, JF2, J1 and J0 to the input control board. See Wiring Diagram.
4. Carefully place the top tray in the down position and tighten lock nuts.
5. Perform the ***Case Cover Replacement Procedure***.
6. Perform the ***Retest After Repair Procedure***.

INPUT POWER BOARD
REMOVAL AND REPLACEMENT PROCEDURE

⚠ WARNING

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

TEST DESCRIPTION

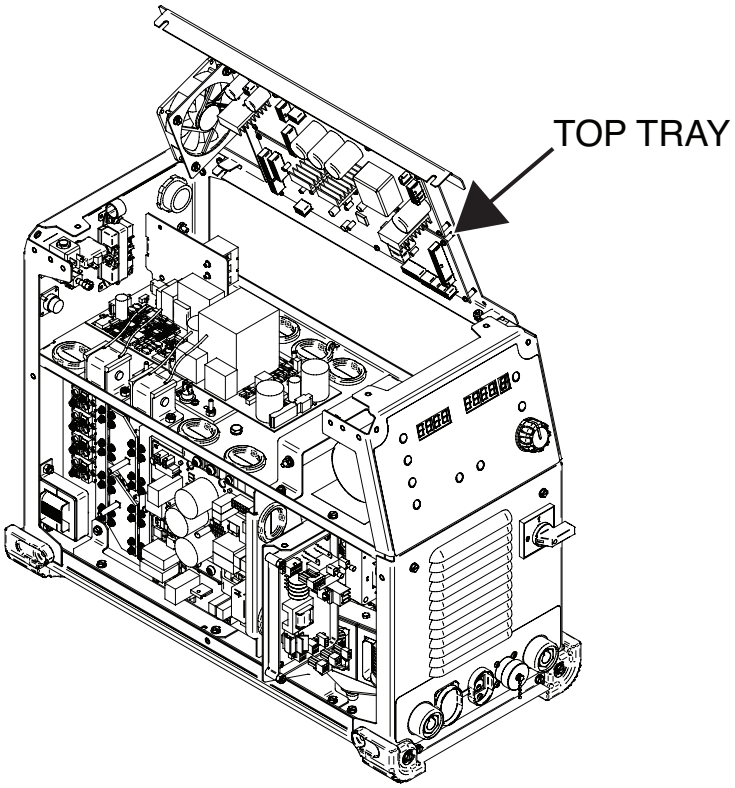
This procedure will aid the technician in the removal and replacement of the Input Power Board.

MATERIALS NEEDED

Phillips Screwdriver
Wiring Diagram

INPUT POWER BOARD
REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

Figure F.92 – Top tray location



REMOVAL PROCEDURE

1. Remove the input power to the Aspect 375 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Capacitor Discharge Procedure***.
4. Carefully maneuver the top tray into the upright position by tilting the top tray up and to the right. A non conductive brace will need to be used to hold the top tray in the upright position. See Figure F.92.

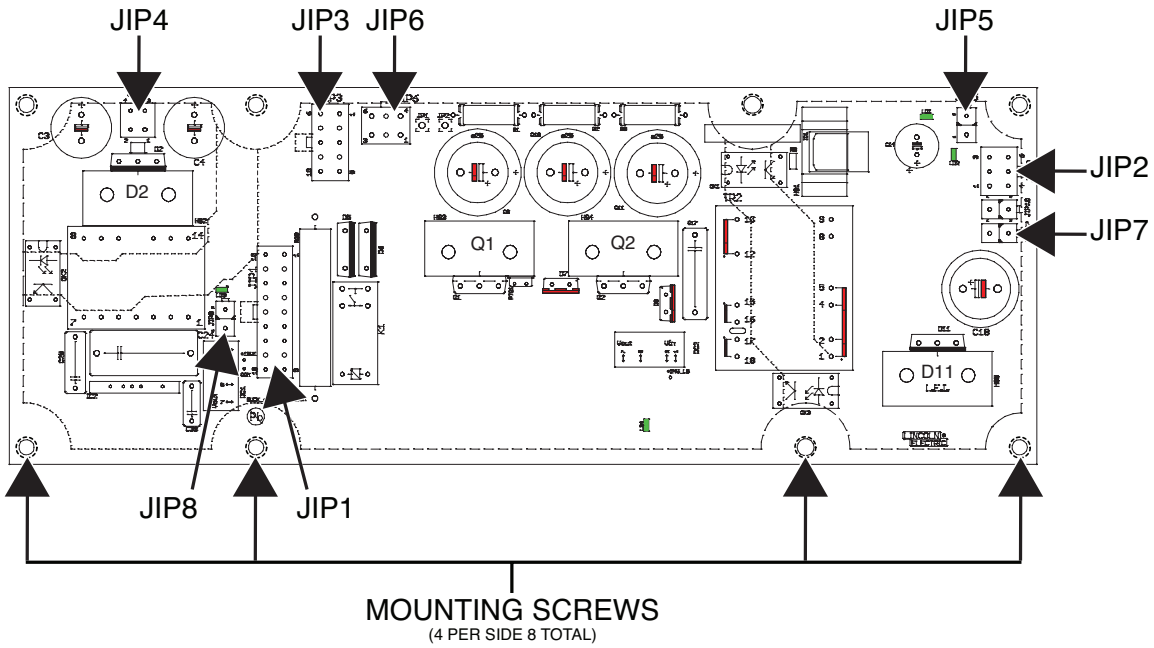
NOTE: It may be necessary to label and disconnect some plugs to place the top tray into the upright position. See Wiring Diagram.

5. Label and disconnect plugs JIP1, JIP2, JIP3, JIP4, JIP5, JIP6, JIP7 and JIP8 from the input power board. See ***Figure F.93***. See Wiring Diagram.
6. Using a phillips screwdriver, remove the eight screws and washers securing the input power board to the machine. See ***Figure F.93***.
7. The input power board can now be removed and replaced.

INPUT POWER BOARD

REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

Figure F.93 – Input power board plug locations



REPLACEMENT PROCEDURE

1. Carefully position the new input power board into the machine.
2. Using a phillips screwdriver, attach the eight screws and washers securing the input power board to the machine.
3. Connect plugs JIP1, JIP2, JIP3, JIP4, JIP5, JIP6, JIP7 and JIP8 to the input power board. See Wiring Diagram.
4. Carefully place the PC board bracket in the down position and tighten lock nuts.
5. Perform the ***Case Cover Replacement Procedure***.
6. Perform the ***Retest After Repair Procedure***.

HIGH FREQUENCY BOARD
REMOVAL AND REPLACEMENT PROCEDURE

⚠ WARNING

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

TEST DESCRIPTION

This procedure will aid the technician in the removal and replacement of the High Frequency Board.

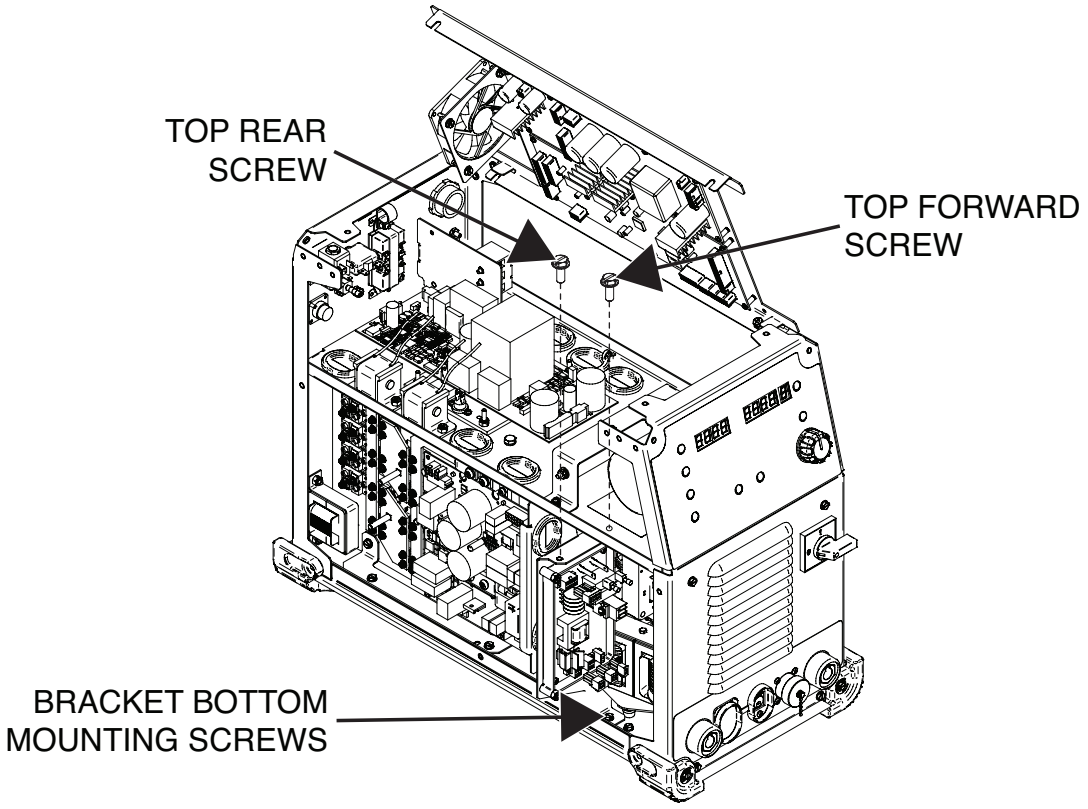
MATERIALS NEEDED

5/16” Nutdriver
3/8” Nutdriver
Wiring Diagram

HIGH FREQUENCY BOARD

REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

Figure F.94 – High frequency board bracket mounting screw locations



REMOVAL PROCEDURE

1. Remove the input power to the Aspect 375 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Capacitor Discharge Procedure***.
4. Using a 5/16” nutdriver, remove the top forward screw securing the high frequency board mounting bracket. See Figure F.94.

NOTE: The top rear and bottom screws can remain.

5. Rotate the mounting bracket to gain access to the plugs and leads.

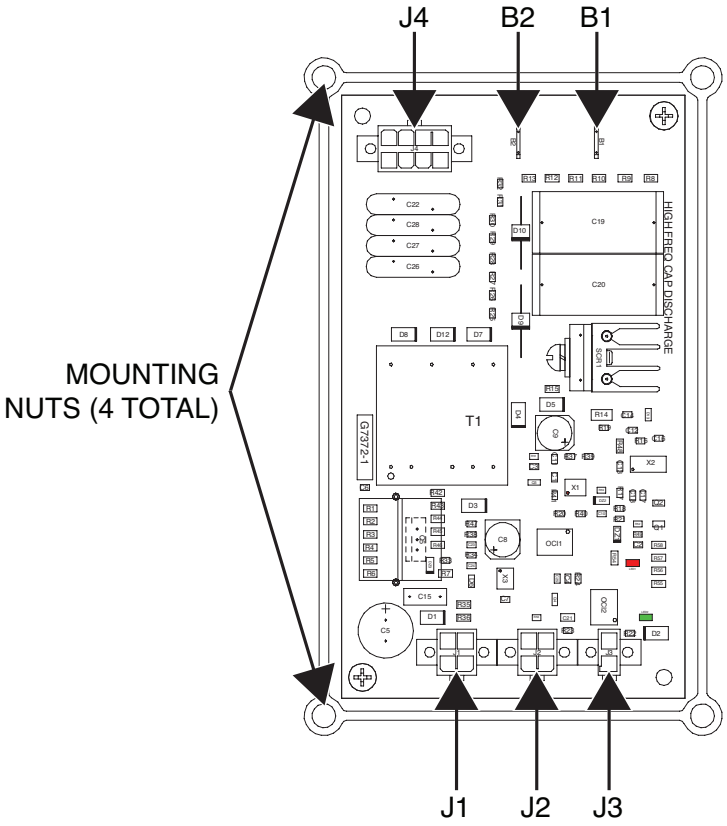
NOTE: Mounting bracket will pivot on the top and bottom screws.

6. Label and disconnect plugs J1, J2, J3 and J4 from the high frequency board. See ***Figure F.95***. See Wiring Diagram.
7. Label and disconnect leads 215 and 216 from terminals B2 and B1 on the high frequency board. See ***Figure F.95***. See Wiring Diagram.
8. Using a 5/16” nutdriver, remove the top rear and bottom bracket mounting screws. The mounting bracket and high frequency board can now be removed from the machine. Note position upon removal.
9. Using a 3/8” nutdriver, remove the four nuts securing the high frequency board to the mounting bracket. See ***Figure F.95***.
10. The high frequency board can now be removed and replaced.

HIGH FREQUENCY BOARD

REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

Figure F.95 – High frequency board plug and mounting nut locations



REPLACEMENT PROCEDURE

1. Carefully position the new high frequency board onto the high frequency board mounting bracket.
2. Using a 3/8” nutdriver, attach the four nuts securing the high frequency board to the mounting bracket. Torque to 13 in/lbs.
3. Place the high frequency board and mounting bracket into the machine. Secure the using the previously removed bottom and top rear mounting screws.
4. Connect leads 215 and 216 to terminals B2 and B1 of the high frequency board. See Wiring Diagram.
5. Connect plugs J1, J2, J3 and J4 to the high frequency board. See Wiring Diagram.
6. Pivot the mounting bracket into the proper position.
7. Using a 5/16” nutdriver, attach the top forward screw securing the high frequency board mounting bracket to the machine.
8. Perform the ***Case Cover Replacement Procedure***.
9. Perform the ***Retest After Repair Procedure***.

USER INTERFACE BOARD
REMOVAL AND REPLACEMENT PROCEDURE

⚠ WARNING

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

TEST DESCRIPTION

This procedure will aid the technician in the removal and replacement of the User Interface Board.

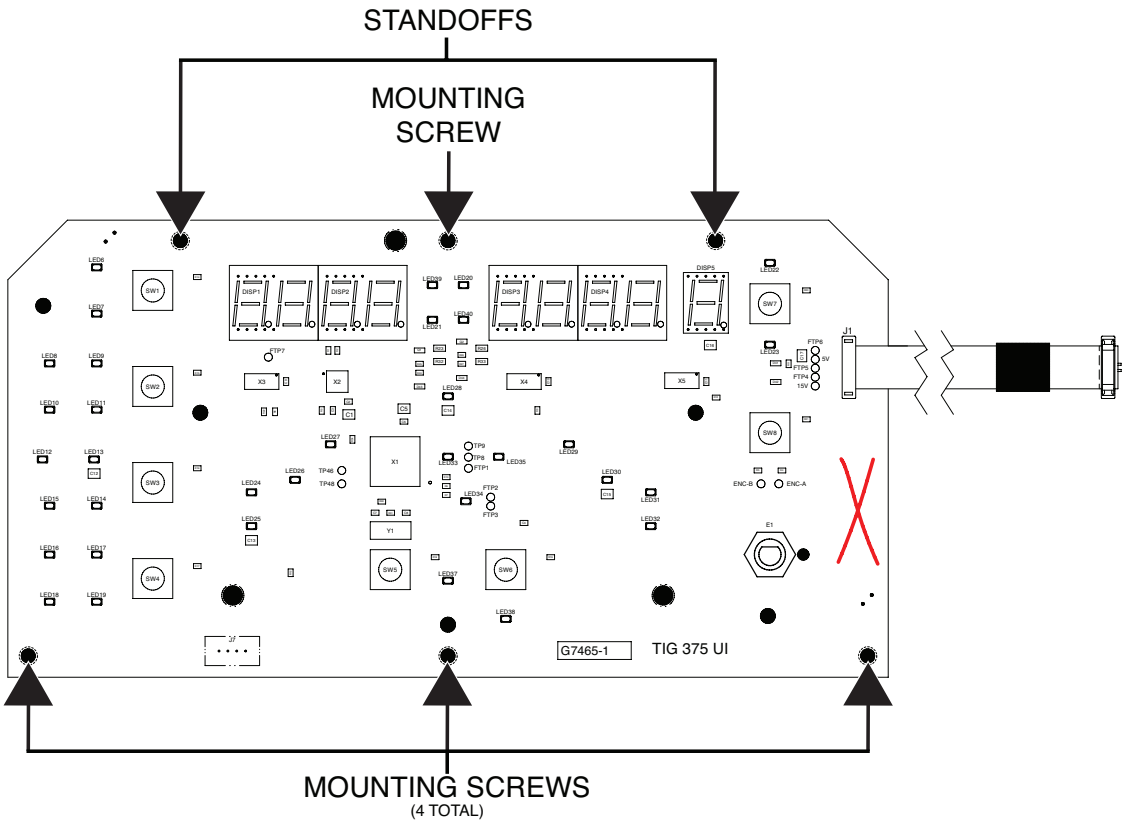
MATERIALS NEEDED

Phillips Screwdriver
1/4” Nutdriver
5/64” Allen Wrench
Wiring Diagram

USER INTERFACE BOARD

REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

Figure F.96 – User interface board mounting screw and standoff locations



REMOVAL PROCEDURE

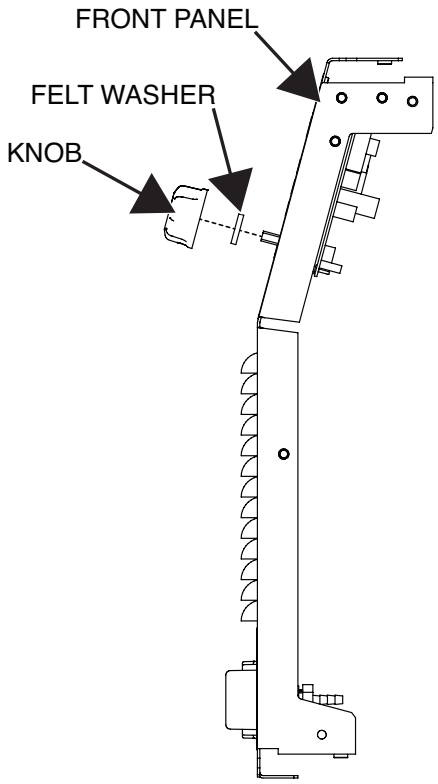
1. Remove the input power to the Aspect 375 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Capacitor Discharge Procedure***.
4. Perform the ***Control Board Removal Procedure***.

NOTE: The user interface board and the control board are piggy backed together. The user interface board is against the case front and the control board is piggy backed to the user interface board.

5. Using a phillips screwdriver, remove the four screws and washers securing the user interface board to the machine. See Figure F.96.
6. Using a 1/4" nutdriver, remove the two standoffs securing the user interface board to the machine. See Figure F.96.
7. Using a 5/64" allen wrench, loosen the set screw securing the knob to the front panel. See ***Figure F.97***. Note felt washer placement for reassembly.
8. The user interface board can now be removed and replaced.

USER INTERFACE BOARD
REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

Figure F.97 – Knob and flat washer locations



REPLACEMENT PROCEDURE

1. Carefully position the new user interface board into the machine.
2. Carefully position the felt washer and knob in place on the front panel.
3. Using a 5/64” allen wrench, tighten the set screw securing the knob to the front panel.
4. Using a 1/4” nutdriver, attach the two standoffs securing the user interface board to the machine.
5. Using a phillips screwdriver, attach the four screws and washers securing the user interface board to the machine.

NOTE: The user interface board and the control board are piggy backed together. The user interface board is against the case front and the control board is piggy backed to the user interface board.

6. Perform the ***Control Board Replacement Procedure***.
7. Perform the ***Case Cover Replacement Procedure***.
8. Perform the ***Retest After Repair Procedure***.

CONTROL BOARD
REMOVAL AND REPLACEMENT PROCEDURE

⚠ WARNING

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

TEST DESCRIPTION

This procedure will aid the technician in the removal and replacement of the Control Board.

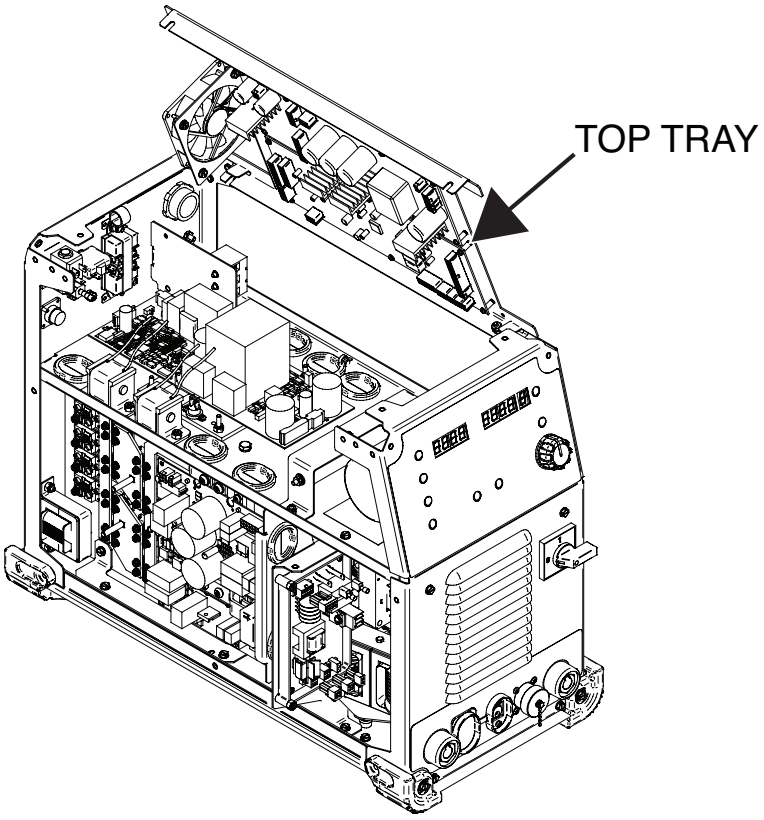
MATERIALS NEEDED

Slotted Screwdriver
Phillips Screwdriver
Needle Nose Pliers
Wiring Diagram

CONTROL BOARD

REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

Figure F.98 – Top tray location



REMOVAL PROCEDURE

1. Remove the input power to the Aspect 375 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Capacitor Discharge Procedure***.
4. Carefully maneuver the top tray into the upright position by tilting the top tray up and to the right. A non conductive brace will need to be used to hold the top tray in the upright position. See Figure F.98.

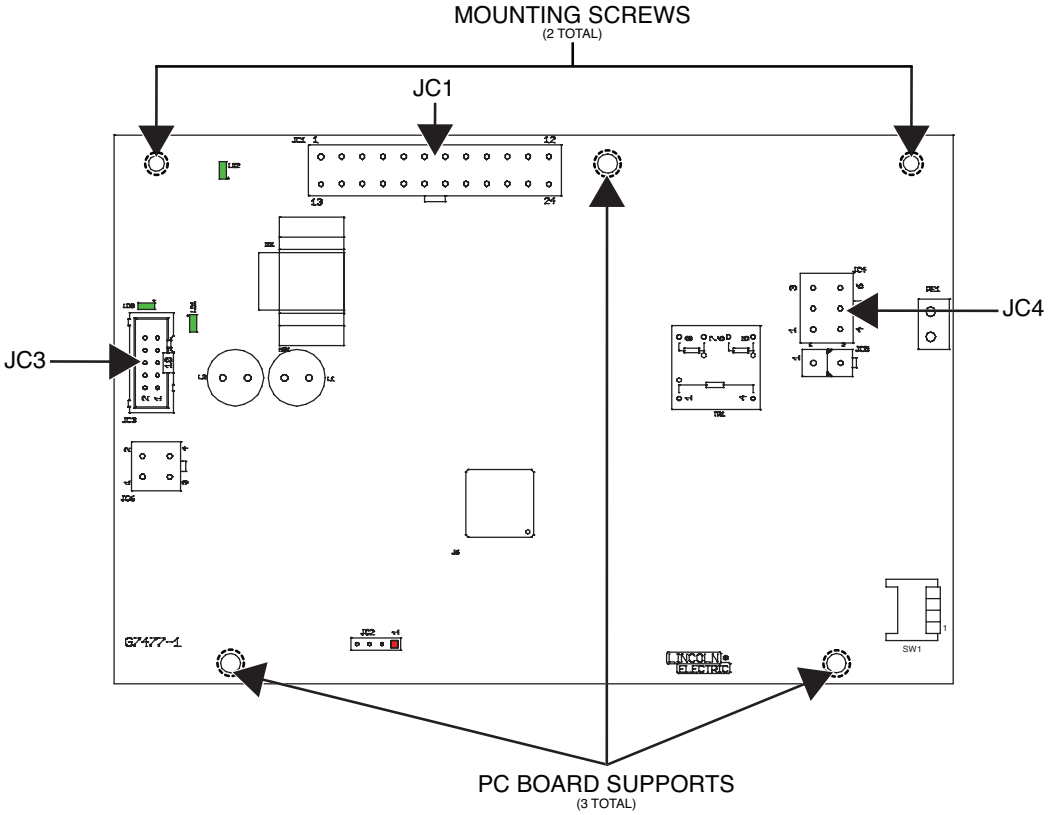
NOTE: It may be necessary to label and disconnect some plugs from the input power board to place the top tray into the upright position. See Wiring Diagram.

5. Label and disconnect the plugs JC, JC4 and JC3 from the control board. See ***Figure F.99***. See Wiring Diagram.
6. Label and disconnect the ground lead (PE1) from the control board. See ***Figure F.99***. See Wiring Diagram.
7. Using a phillips screwdriver, remove the two screws and washers securing the control board to the machine. See ***Figure F.99***.
8. Using needle nose pliers, compress the three PC board support tabs and separate the control board from the user interface board. See ***Figure F.99***.
9. The control board can now be removed and replaced.

CONTROL BOARD

REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

Figure F.99 – Control board mounting screw and pc board support locations



REPLACEMENT PROCEDURE

1. Carefully position the new control board into the machine.
2. Press the control board onto the three locking tabs, securing the control board to the user interface board.
3. Connect the ground lead (PE1) to the control board. See Wiring Diagram.
4. Connect plugs JC, JC4 and JC3 to the control board. See Wiring Diagram.
5. Using a phillips screwdriver, attach the two screws and washers securing the control board to the machine.
6. Carefully place the top tray in the down position and tighten lock nuts.
7. Perform the ***Case Cover Replacement Procedure***.
8. Perform the ***Retest After Repair Procedure***.

115V AUXILIARY BOARD
REMOVAL AND REPLACEMENT PROCEDURE

⚠ WARNING

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

TEST DESCRIPTION

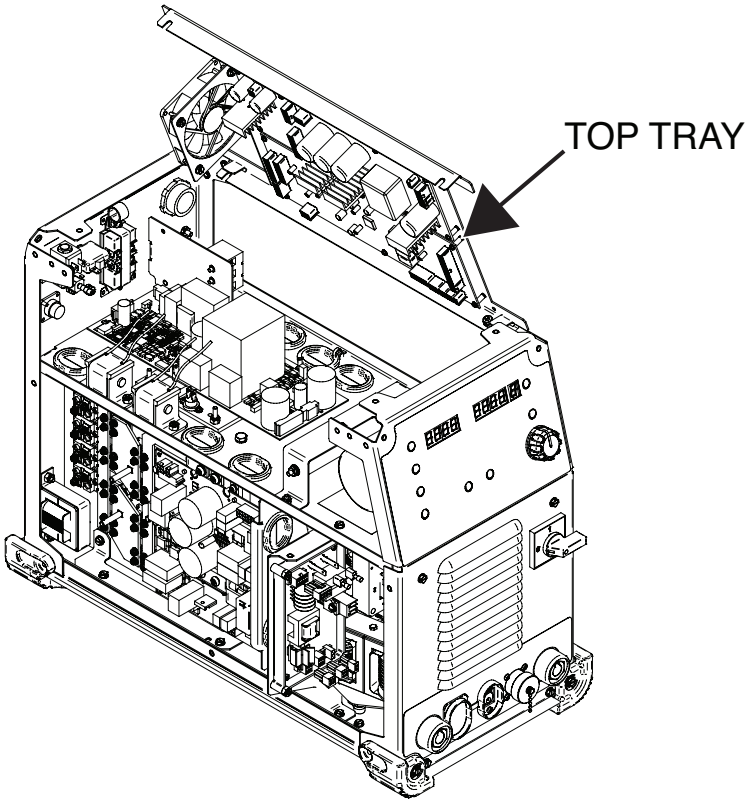
This procedure will aid the technician in the removal and replacement of the 115V Auxiliary Board.

MATERIALS NEEDED

3/8” Deep Well Socket
Wiring Diagram

115V AUXILIARY BOARD
REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

Figure F.100 – Top tray location



REMOVAL PROCEDURE

1. Remove the input power to the Aspect 375 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Capacitor Discharge Procedure***.
4. Carefully maneuver the top tray into the upright position by tilting the top tray up and to the right. A non conductive brace will need to be used to hold the top tray in the upright position. See Figure F.100.

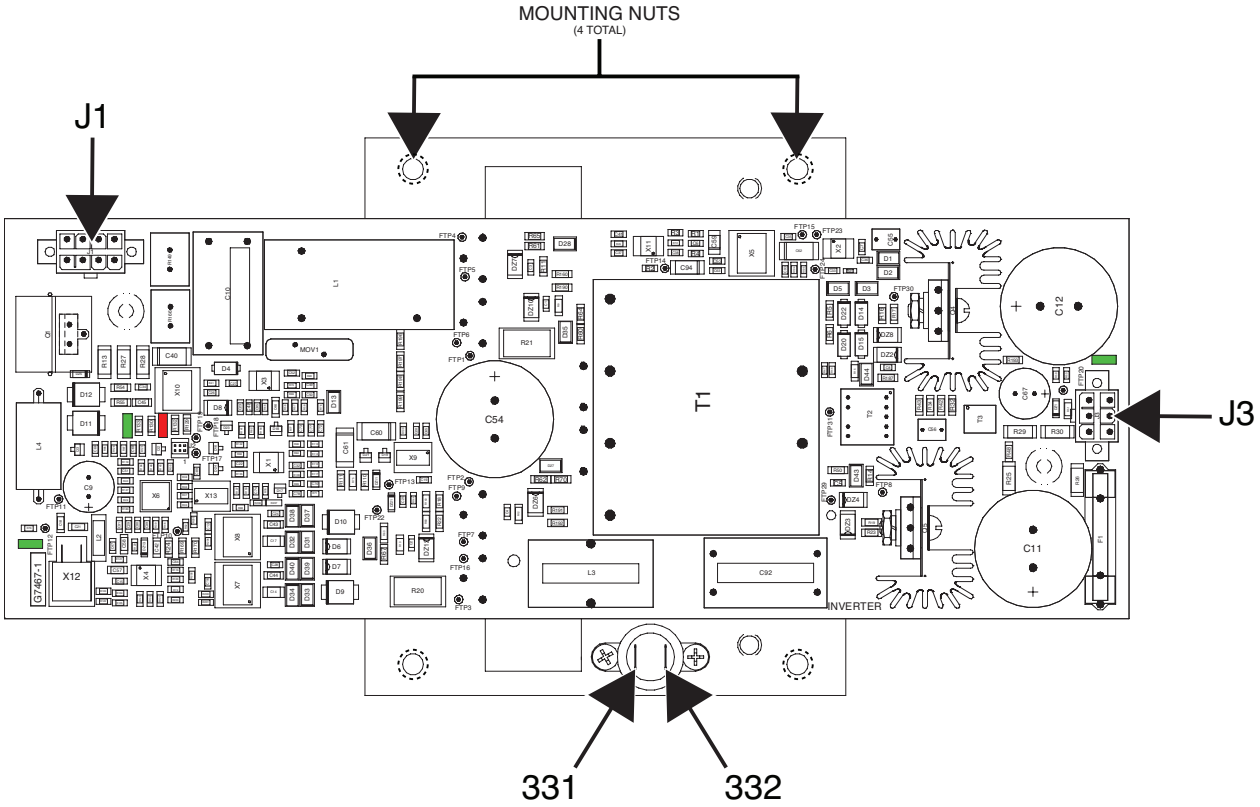
NOTE: It may be necessary to label and disconnect some plugs from the input power board to place the top tray into the upright position. See Wiring Diagram.

5. Label and disconnect plugs J3 and J1 from the 115V auxiliary board. See ***Figure F.101***. See Wiring Diagram.
6. Label and disconnect leads 332 and 331 from the 115V auxiliary board. See ***Figure F.101***. See Wiring Diagram.
7. Using a 3/8" deep well nutdriver, remove the four locknut's securing the 115V auxiliary board to the machine. See ***Figure F.101***.
8. The 115V auxiliary board can now be removed and replaced.

115V AUXILIARY BOARD

REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

Figure F.101 – 115V auxiliary board plug and lead locations



REPLACEMENT PROCEDURE

1. Carefully position the new 115V auxiliary board into the machine.
2. Using a 3/8” deep well nutdriver, attach the four locknut’s securing the 115V auxiliary board to the machine.
3. Connect plugs J3 and J1 to the 115V auxiliary board. See Wiring Diagram.
4. Connect leads 332 and 331 to the 115V auxiliary board. See Wiring Diagram.
5. Carefully place the top tray in the down position and tighten lock nuts.
6. Perform the ***Case Cover Replacement Procedure***.

OUTPUT CHOKE
REMOVAL AND REPLACEMENT PROCEDURE

⚠ WARNING

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

TEST DESCRIPTION

This procedure will aid the technician in the removal and replacement of the Output Choke.

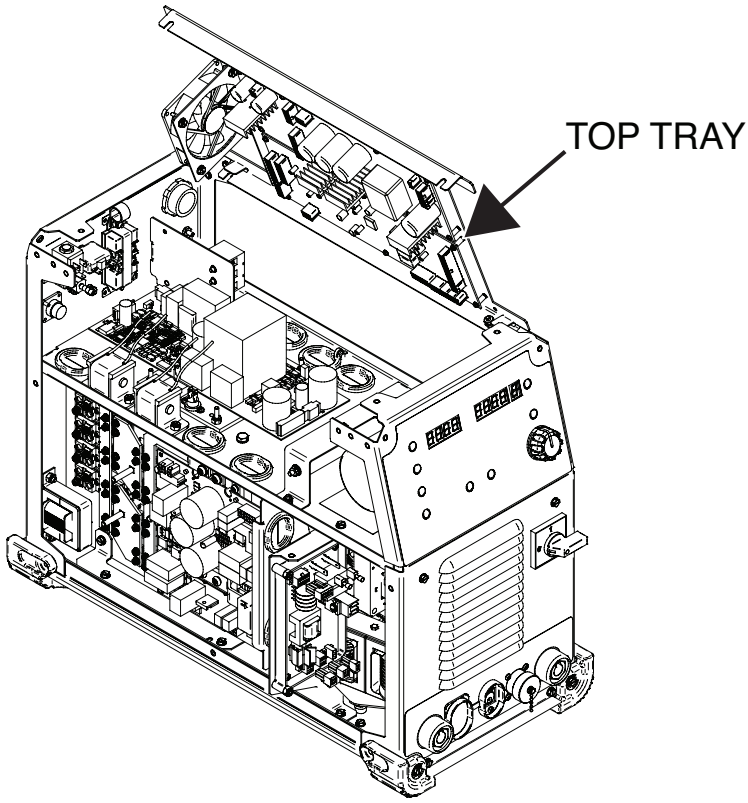
MATERIALS NEEDED

5/16” Nutdriver
7/16” Nutdriver With Extension
7/16” Open End Wrench
Wiring Diagram

OUTPUT CHOKE

REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

Figure F.102 – Top tray position



REMOVAL PROCEDURE

1. Remove the input power to the Aspect 375 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Capacitor Discharge Procedure***.
4. Carefully maneuver the top tray into the upright position by tilting the top tray up and to the right. A non conductive brace will need to be used to hold the top tray in the upright position. See Figure F.102.

NOTE: It may be necessary to label and disconnect some plugs from the input power board to place the top tray into the upright position. See Wiring Diagram.

5. Using a 5/16" nutdriver, remove the three screws (two screws on top and one on the bottom) securing the high frequency board mounting bracket to the machine. See ***Figure F.103***. The high frequency board can now be maneuvered out of the way to gain access to the output choke. Plugs can remain connected to the high frequency board.
6. Using a 7/16" nutdriver and a 7/16" open end wrench, remove the two bolts and associated washers securing the output choke connections. One connection is on the output bus bar and the other is to the high frequency transformer and lead 206A. Label and disconnect lead 206A. See ***Figure F.104***. See Wiring Diagram. A socket extension may be necessary.
7. Using a 5/16" nutdriver, remove the three screws securing the output choke to the mid shelf assembly. The choke mounting screws are located by the bus capacitor. See ***Figure F.105***.
8. The output choke can now be removed and replaced.

OUTPUT CHOKE

REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

Figure F.103 – High frequency board mounting bracket screw locations

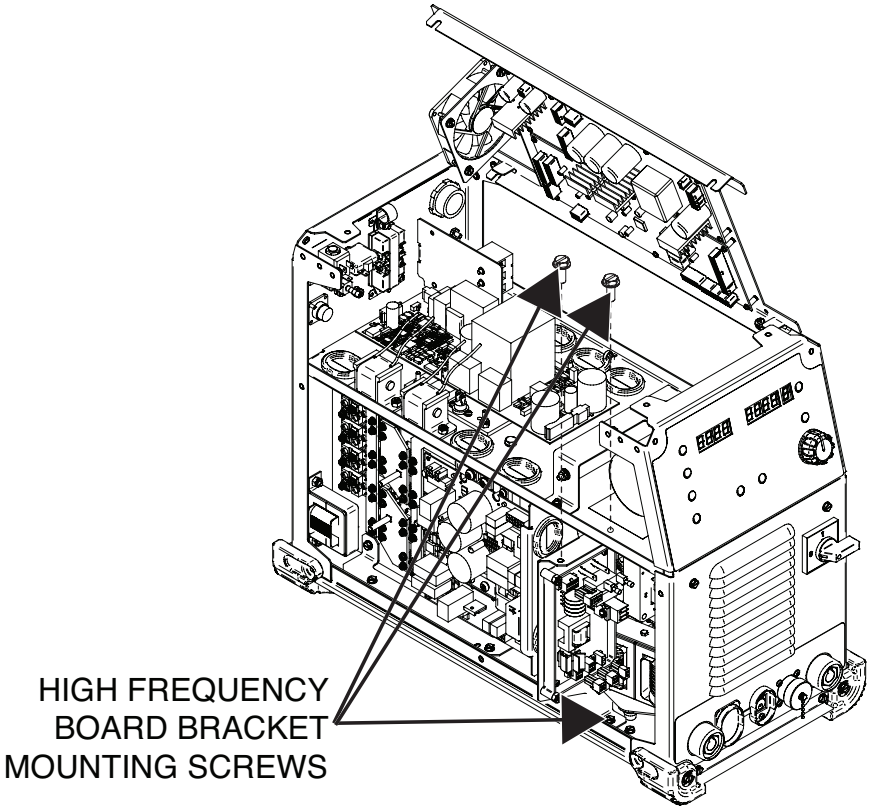
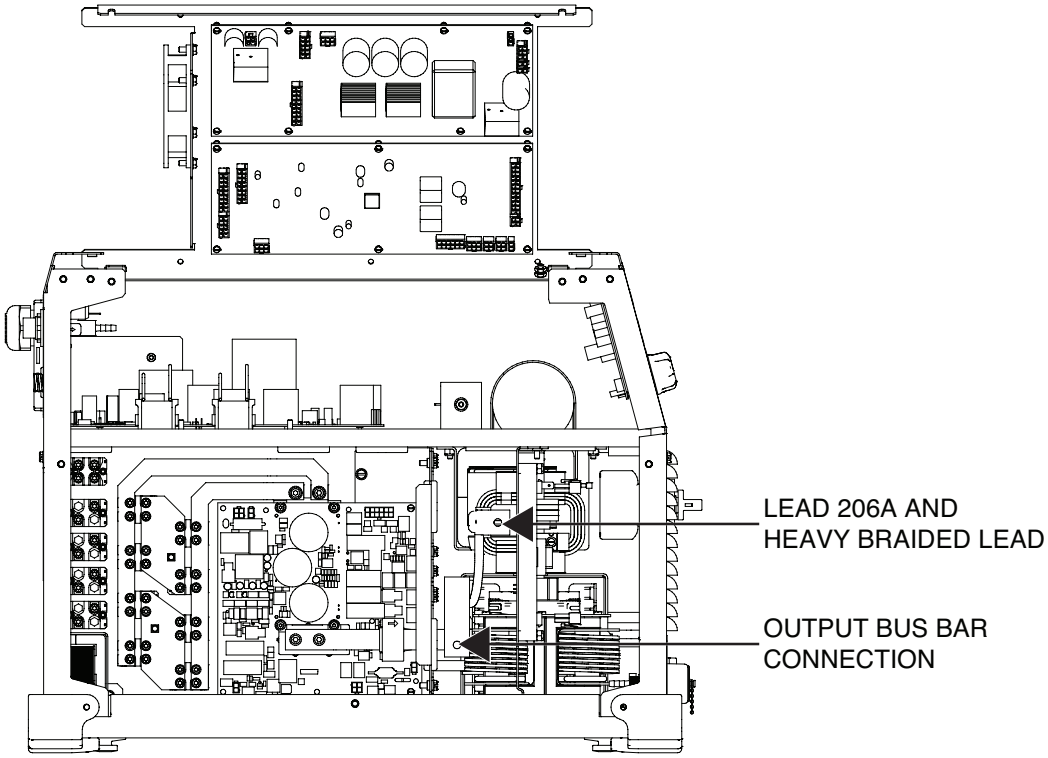


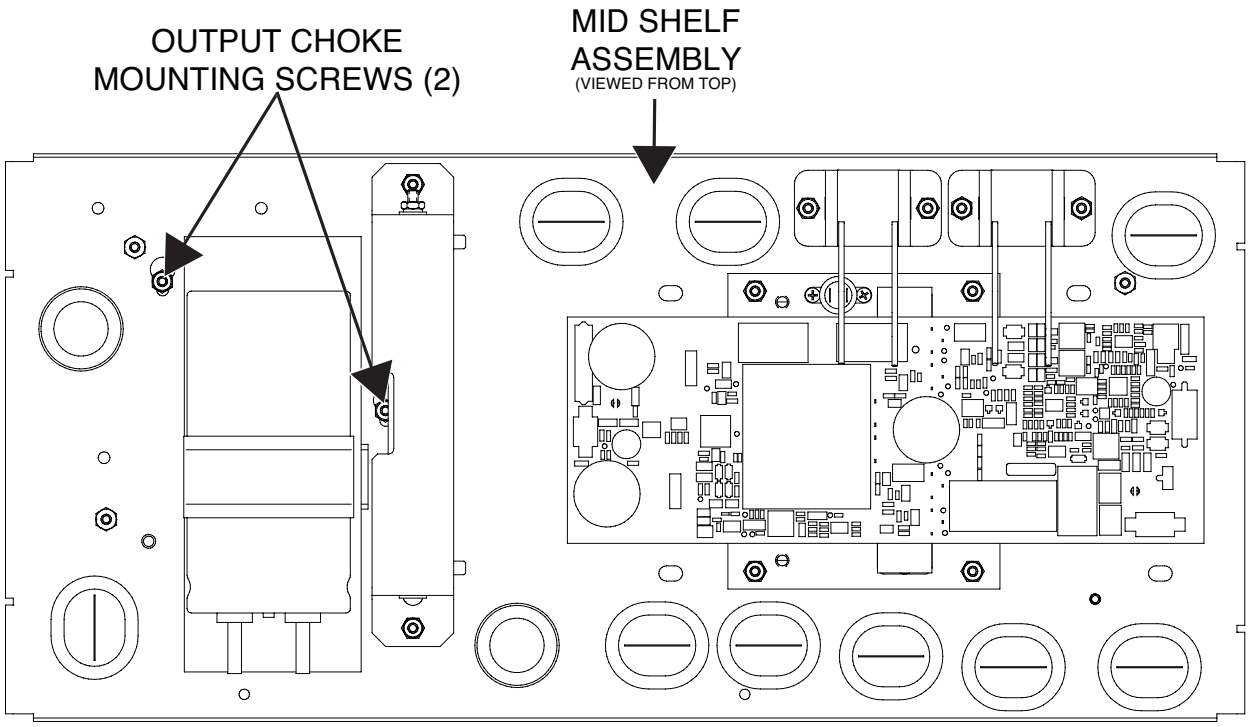
Figure F.104 – Output choke connections



OUTPUT CHOKE

REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

Figure F.105 – Output choke mounting screw locations (view from top)



REPLACEMENT PROCEDURE

1. Carefully position the new output choke into the machine.
2. Using a 5/16” nutdriver, attach the two screws securing the output choke to the mid shelf assembly.
3. Using a 7/16” nutdriver and a 7/16” open end wrench, attach the two bolts and associated washers securing the output choke connections. One connection is on the output bus bar and the other is to the high frequency transformer and lead 206A. See Wiring Diagram.
4. Carefully position the high frequency board mounting bracket into the machine.
5. Using a 5/16” nutdriver, attach the three screws (two screws on top and one on the base) securing the high frequency board mounting bracket to the machine.
6. Carefully place the top tray in the down position and tighten lock nuts.
7. Perform the ***Case Cover Replacement Procedure***.
8. Perform the ***Retest After Repair Procedure***.

MAIN TRANSFORMER
REMOVAL AND REPLACEMENT PROCEDURE

⚠ WARNING

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

TEST DESCRIPTION

This procedure will aid the technician in the removal and replacement of the Main Transformer.

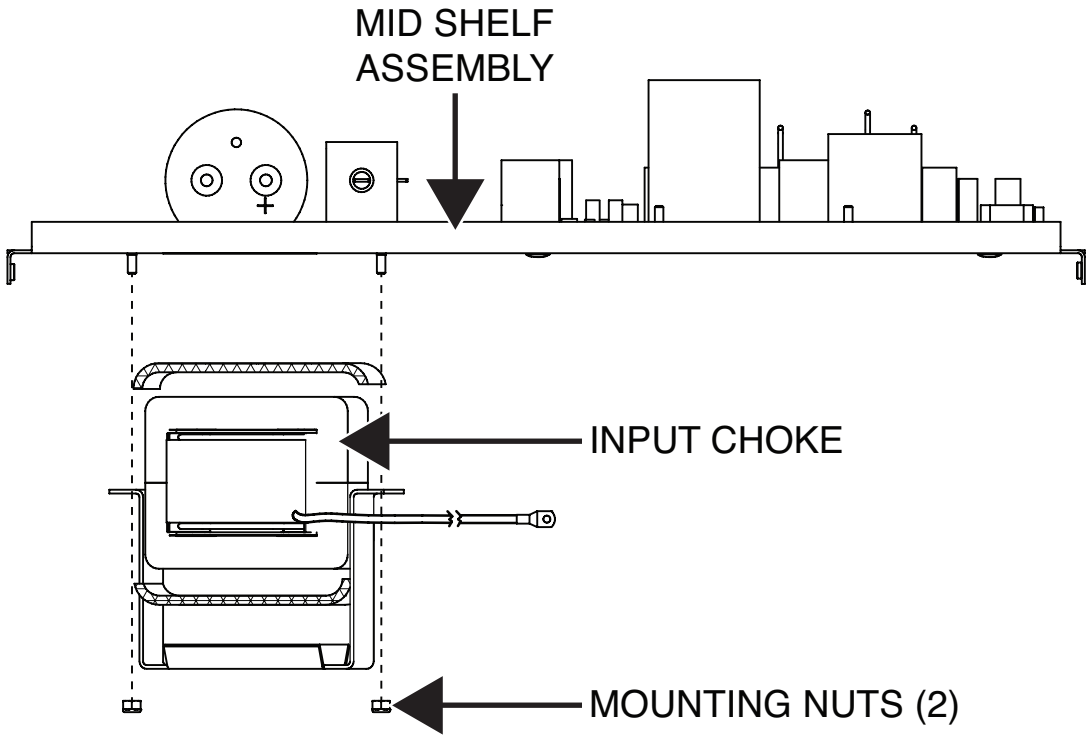
MATERIALS NEEDED

3/8” Nutdriver
Torx Nutdriver (Size T20)
11/16” Open End Wrench
7/16” Deep Well Nutdriver
Wiring Diagram

MAIN TRANSFORMER

REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

Figure F.106 – Input choke removal



REMOVAL PROCEDURE

1. Remove the input power to the Aspect 375 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Capacitor Discharge Procedure***.
4. Using a 3/8” nutdriver, remove the two nuts securing the input choke to the mid shelf assembly. Note placement of the input choke bracket for reassembly. See Figure F.106.

NOTE: Remove input choke from machine and set aside. It is not necessary to disconnect the leads from the input choke.

5. Using a Torx nutdriver (size T20), label and disconnect leads H1 and H2 from the inverter board. See ***Figure F.107***. See Wiring Diagram. Note washer placement for reassembly.
6. Route the wiring through the grommet on the baffle.
7. Using a 11/16” open end wrench, remove the bolt securing leads 202A, X2 and X4 to the output stud. Label and disconnect leads 202A, X2 and X4. See ***Figure F.108***. See Wiring Diagram.
8. Using a 7/16” deep well nutdriver, label and disconnect leads X1, X5, X3 and X8 from the bus bars. See ***Figure F.109***. See Wiring Diagram.
9. Remove any cable ties, as necessary.
10. Label and disconnect plug J03 from the output board. See ***Figure F.109***. See Wiring Diagram.
11. Label and disconnect leads X6 and X7. See Wiring Diagram.
12. Using a 3/8” nutdriver, remove the four mounting nuts securing the main transformer to the machine. See ***Figure F.110***.
13. The main transformer can be remove and replaced.

MAIN TRANSFORMER

REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

Figure F.107 – Lead H1 and H2 lead connection locations

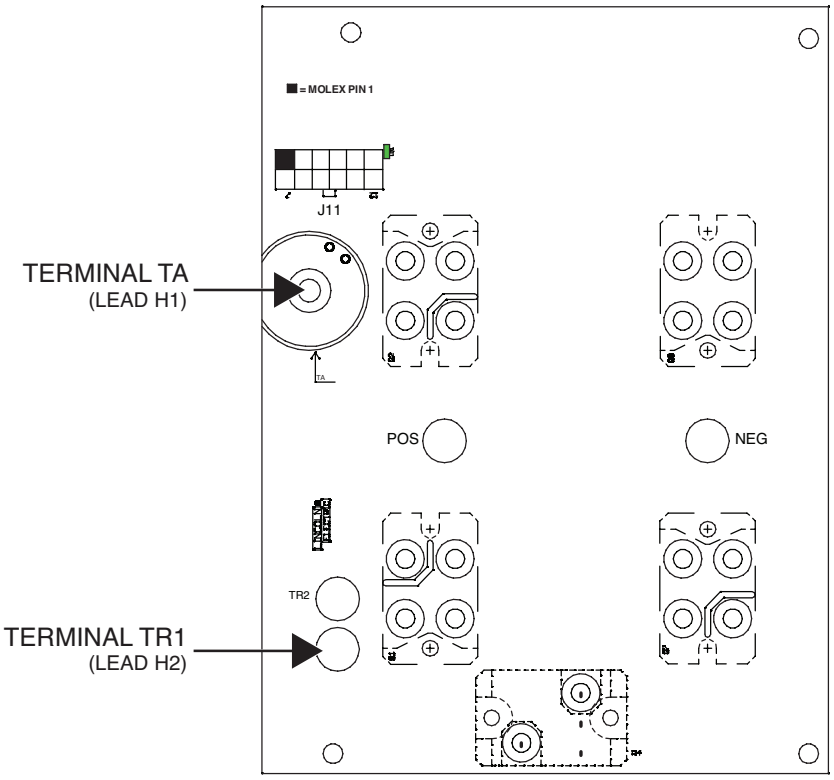
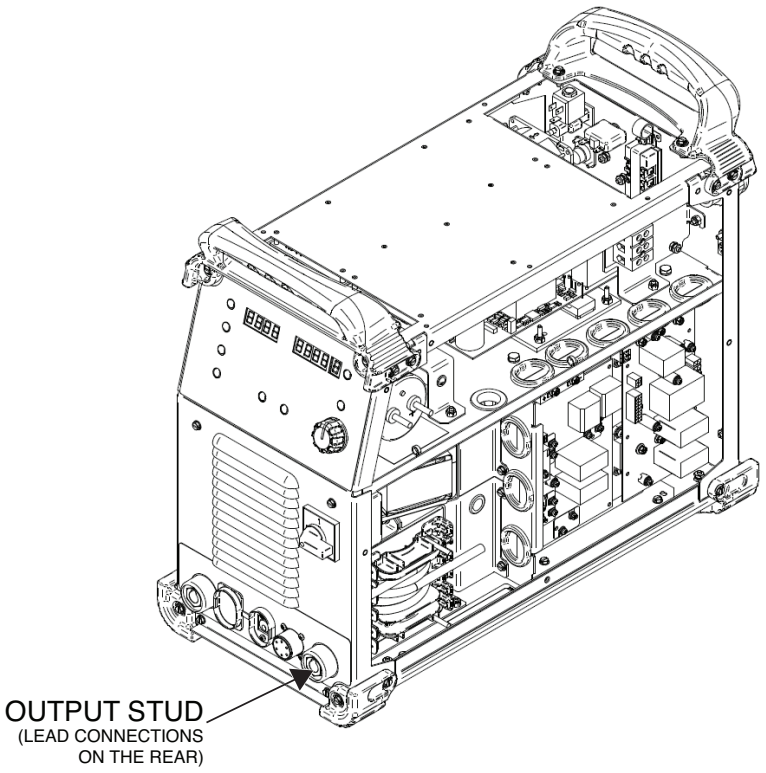


Figure F.108 – Output stud lead connection location



MAIN TRANSFORMER

REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

Figure F.109 – Leads X1, X8, X3, X5 and plug J03 locations

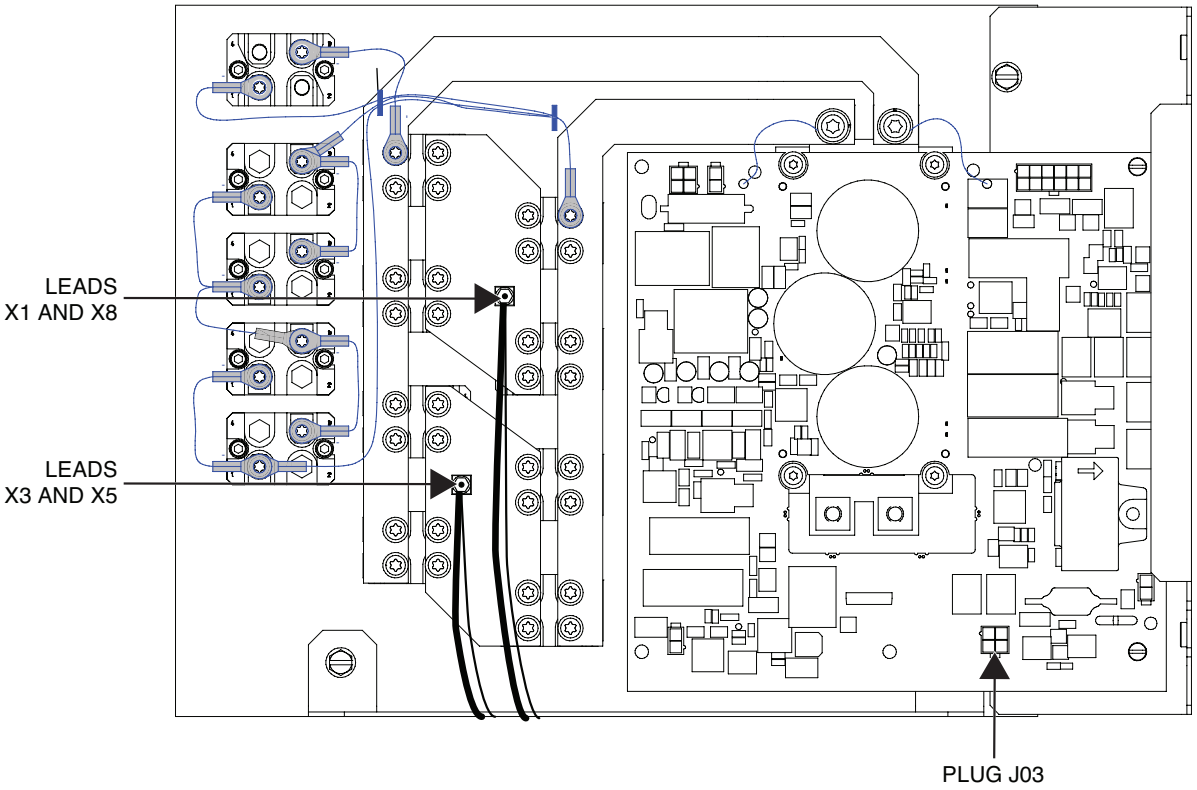
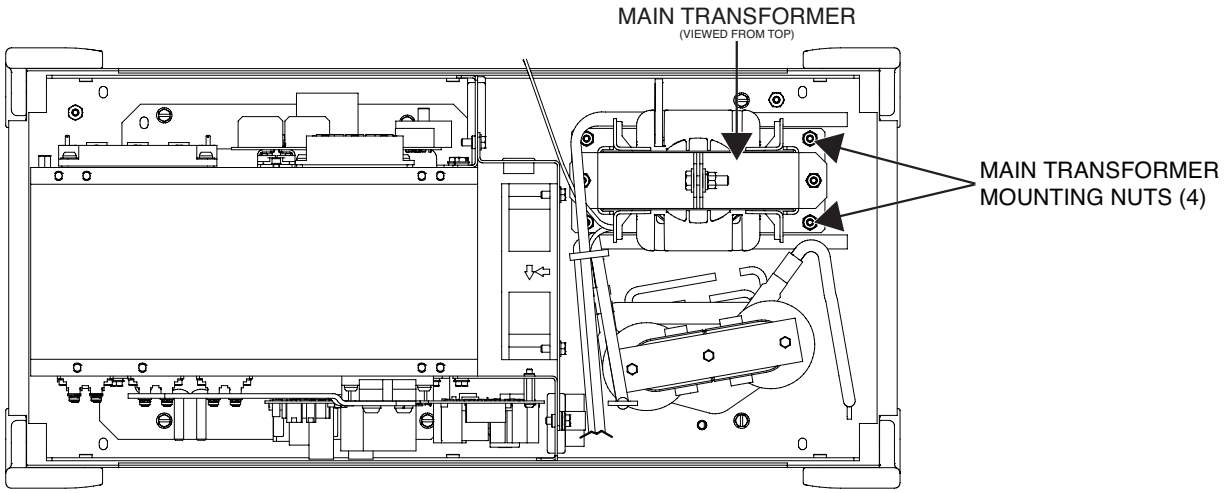


Figure F.110 – Main transformer mounting nut locations



MAIN TRANSFORMER
REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

REPLACEMENT PROCEDURE

1. Carefully position the new main transformer into the machine.
2. Using a 3/8" nutdriver, attach the four mounting nuts securing the main transformer to the machine.
3. Connect leads X6 and X7. See Wiring Diagram.
4. Connect plug J03 to the output board. See Wiring Diagram.
5. Replace any previously removed cable ties.
6. Using a 7/16" deep well nutdriver, connect leads X1, X5, X3 and X8 to the bus bars. See Wiring Diagram.
7. Using a 11/16" open end wrench, attach the bolt securing leads 202A, X2 and X4 to the output stud. See Wiring Diagram. Torque the work output stud connection to 40-45 in/lbs.
8. Route the necessary wiring through the grommet on the baffle.
9. Using a Torx nutdriver (size T20), connect leads H1 and H2 to the inverter board. See Wiring Diagram.
10. Carefully position the input choke into the machine.
11. Using a 3/8" nutdriver, attach the two nuts securing the input choke to the mid shelf assembly.
12. Perform the ***Case Cover Replacement Procedure***.
13. Perform the ***Retest After Repair Procedure***.

FAN(S)
REMOVAL AND REPLACEMENT PROCEDURE

⚠ WARNING

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

TEST DESCRIPTION

This procedure will aid the technician in the removal and replacement of the Fan(s).

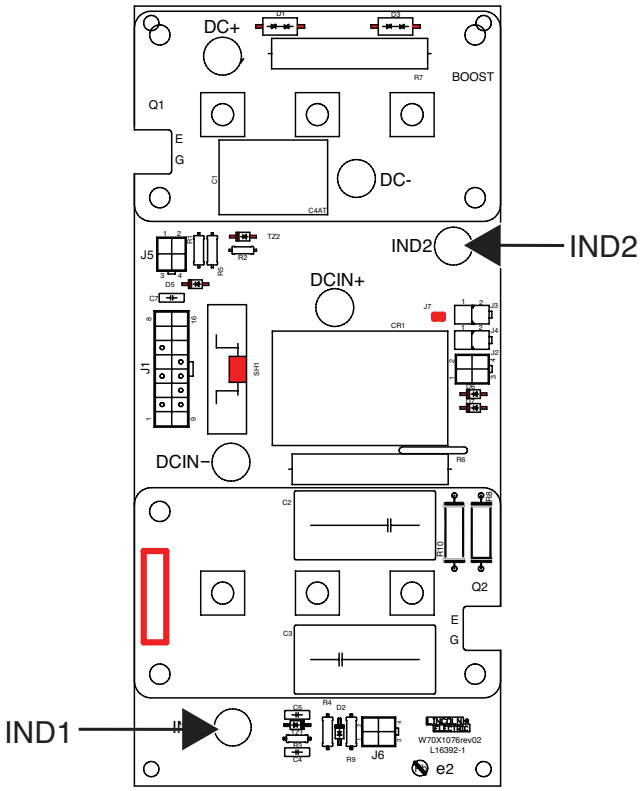
MATERIALS NEEDED

Torx Nutdriver (Size T20)
5/16” Nutdriver
Phillips Screwdriver
Wiring Diagram

FAN(S)

REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

Figure F.111 – Buck/boost board lead connections



REMOVAL PROCEDURE

1. Remove the input power to the Aspect 375 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Capacitor Discharge Procedure***.
4. Perform the ***High Frequency Board Removal Procedure***.
5. Perform the ***Main Transformer Removal Procedure***.
6. Using a Torx nutdriver (size T20), remove the screws, lockwashers and washers securing leads IND1 and IND2 to the buck/boost board. Label and disconnect leads IND1 and IND2 from the buck/boost board. See Figure F.111. See Wiring Diagram.
7. Using a 5/16” nutdriver, remove the nut and washer securing lead 610 to the positive capacitor terminal. See ***Figure F.112***. See Wiring Diagram. Label and disconnect lead 610 from the positive terminal of the 400 VDC bus capacitor.
8. Using a phillips screwdriver, label and disconnect leads AA, BB and CC from the input rectifier. See ***Figure F.113***. See Wiring Diagram.
9. Clear the disconnected leads to gain access to fan brackets.
10. Label and disconnect plugs JFE1 and JFE2 from the fans. See Wiring Diagram.
11. Using a 5/16” nutdriver, remove the four screws (two on each side) securing the upper and lower fan brackets to the machine (eight screws total). See ***Figure F.114***.
12. The fans can now be removed and replaced.

FAN(S)

REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

Figure F.112 – 400 VDC capacitor positive terminal location

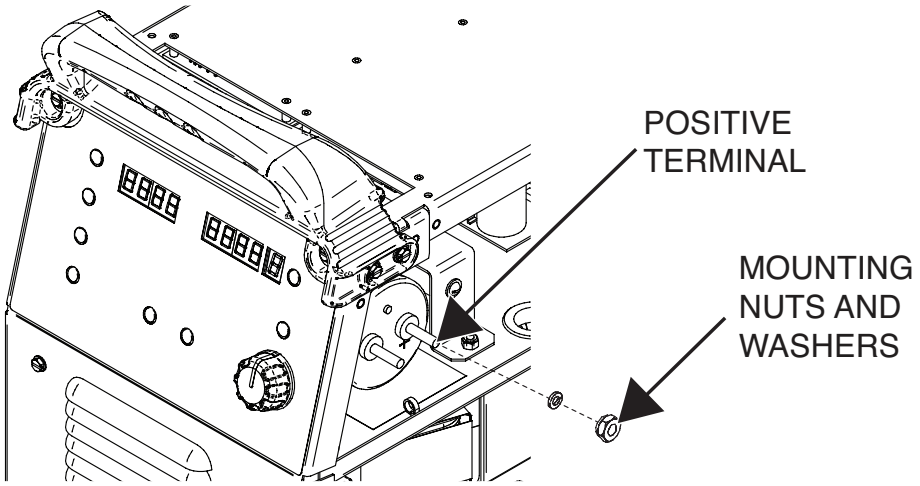
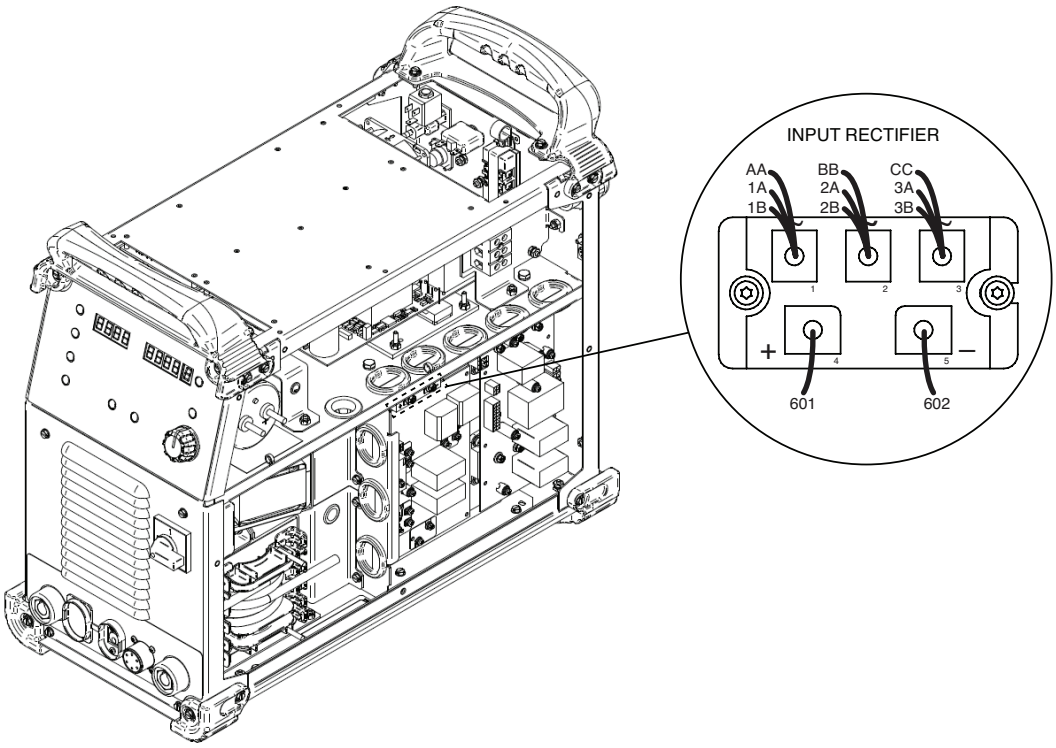


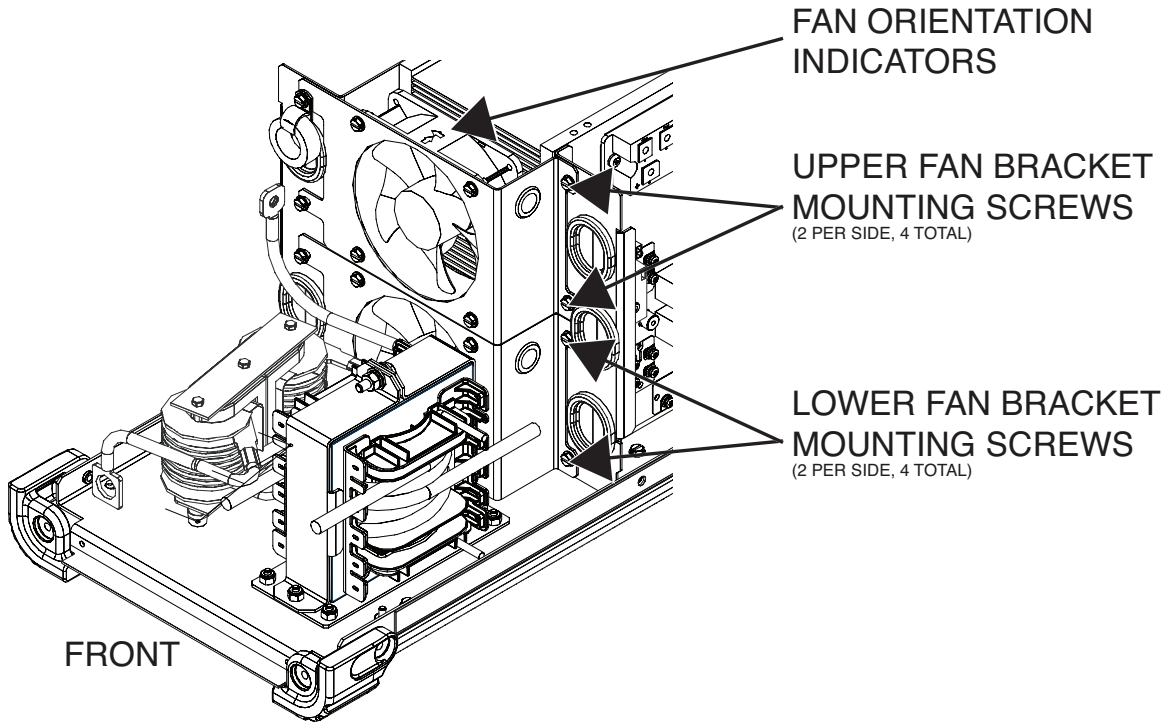
Figure F.113 – Input rectifier lead locations



FAN(S)

REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

Figure F.114 – Fan bracket mounting screw locations



REPLACEMENT PROCEDURE

1. Carefully position the new fan assembly into the machine with the fan orientation indicators facing upward and to the left. See Figure F.114.
2. Using a 5/16" nutdriver, attach the four screws (two on each side) securing the upper and lower fan brackets to the machine (eight screws total). Torque the screws to 11-13 in/lbs.
3. Connect plugs JFE1 and JFE2 to the fans. See Wiring Diagram.
4. Using a phillips screwdriver, connect leads AA, BB and CC to the input rectifier. See Wiring Diagram.
5. Using a 5/16" nutdriver, attach the nut and washer securing lead 610 to the positive capacitor terminal. See Wiring Diagram. Torque lead connection to 18-25 in/lbs.
6. Using a Torx nutdriver (size T20), attach the screws, lockwashers and washers securing leads IND1 and IND2 to the buck/boost board. See Wiring Diagram.
7. Perform the ***Main Transformer Replacement Procedure***.
8. Perform the ***High Frequency Board Replacement Procedure***.
9. Perform the ***Case Cover Replacement Procedure***.
10. Perform the ***Retest After Repair Procedure***.

HIGH FREQUENCY TRANSFORMER REMOVAL AND REPLACEMENT PROCEDURE

⚠ WARNING

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

TEST DESCRIPTION

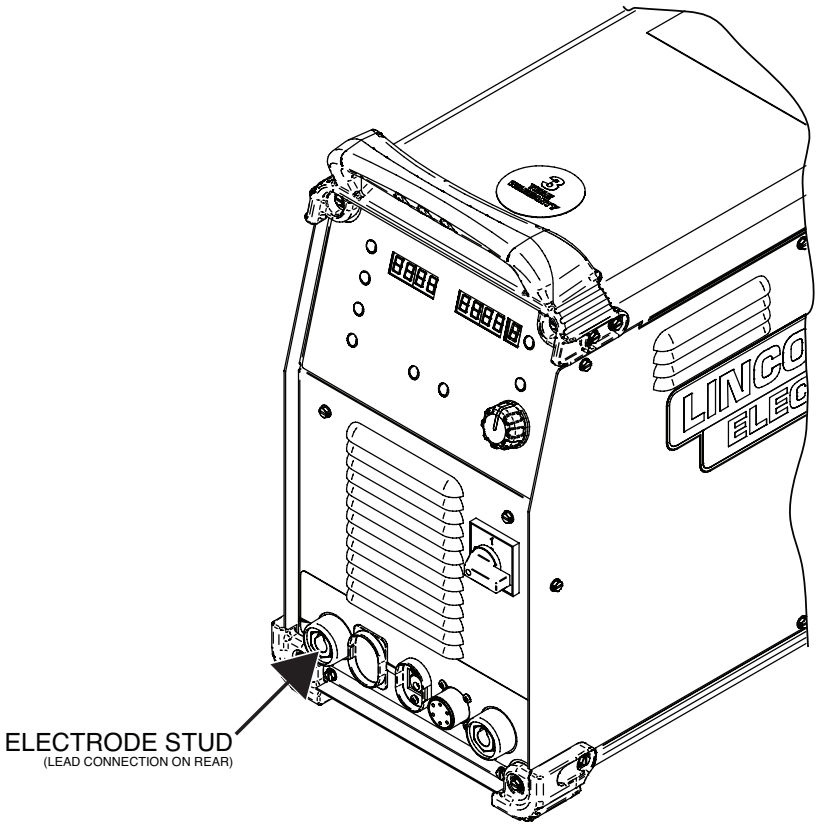
This procedure will aid the technician in the removal and replacement of the High Frequency Transformer.

MATERIALS NEEDED

11/16” Open End Wrench
5/16” Nutdriver
Phillips Screwdriver
Wiring Diagram

HIGH FREQUENCY TRANSFORMER
REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

Figure F.115 – Electrode stud location



REMOVAL PROCEDURE

1. Remove the input power to the Aspect 375 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Capacitor Discharge Procedure***.
4. Perform the ***High Frequency Board Removal Procedure***.
5. Perform the ***Output Choke Removal Procedure***.
6. Using a 11/16” open end wrench, label and disconnect lead T2 and associated washers from the electrode stud. See Figure F.115. See Wiring Diagram.
7. Using a 5/16” nutdriver, remove the two screws (eight screws total) securing each of the four base corner caps to the machine. See ***Figure F.116***.
8. Using a 5/16” nutdriver, remove the four screws securing the red base to the machine. See ***Figure F.117***.
9. Carefully position machine on it’s side and remove the red base.
10. Using a phillips screwdriver, remove the three mounting screws and associated washers securing the high frequency transformer to base. See ***Figure F.118***.
11. The high frequency transformer can now be removed and replaced.

HIGH FREQUENCY TRANSFORMER
REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

Figure F.116 – Corner cap mounting screw and washer locations

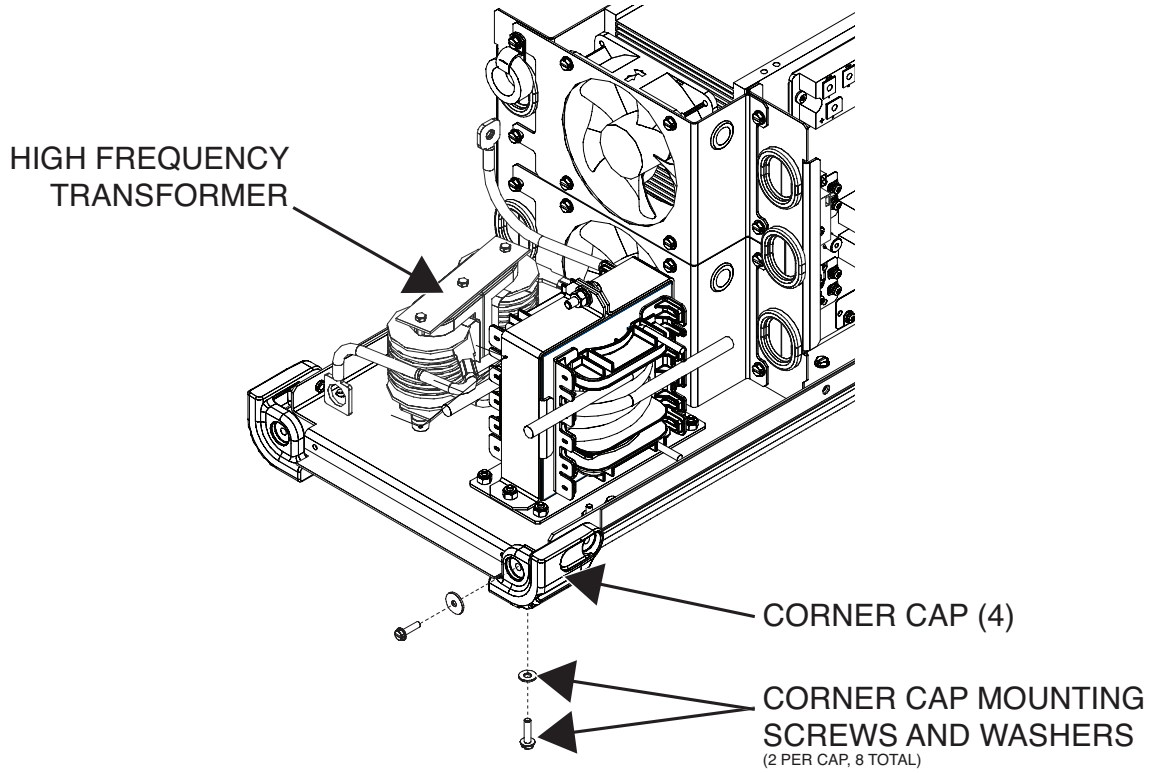
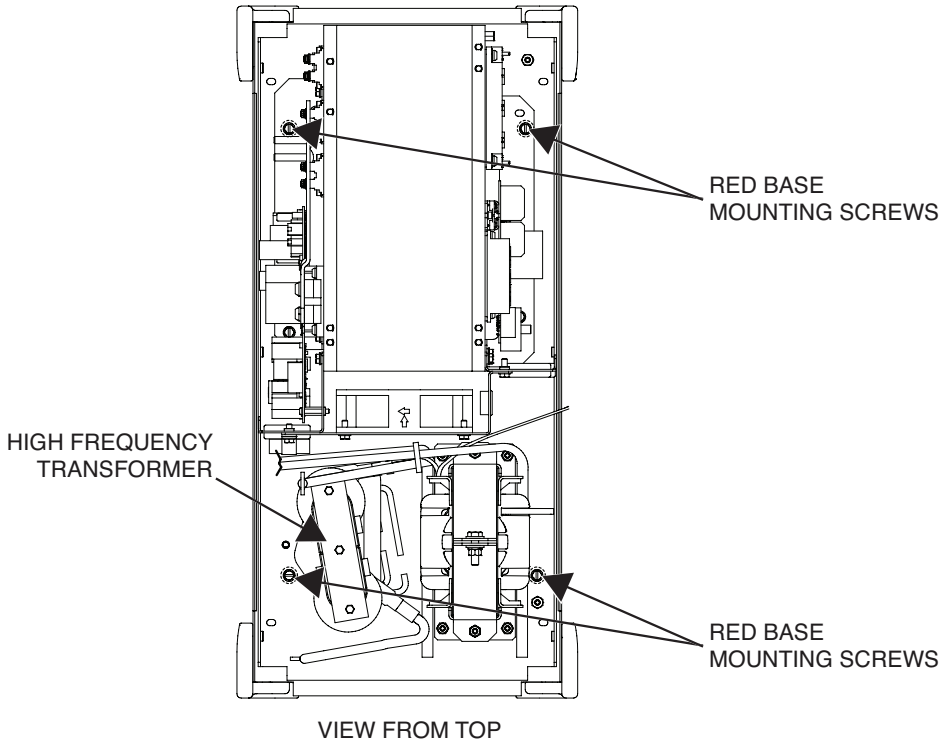
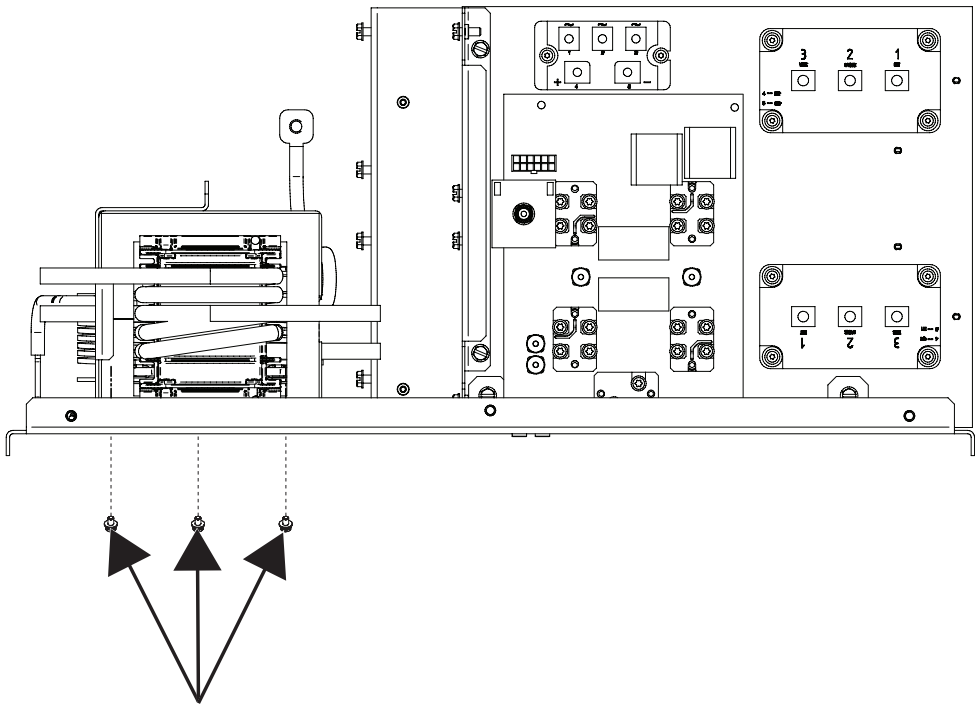


Figure F.117 – Red base mounting screw locations



HIGH FREQUENCY TRANSFORMER
REMOVAL AND REPLACEMENT PROCEDURE *(continued)*

Figure F.118 – High frequency transformer mounting screw locations



REPLACEMENT PROCEDURE

1. Carefully position the new high frequency transformer into the machine.
2. Using a phillips screwdriver, attach the three mounting screws and associated washers securing the high frequency transformer to base.
3. Carefully position the red base onto the machine and return the machine to its normal upright position.
4. Using a 5/16” nutdriver, attach the four screws securing the red base to the machine.
5. Using a 5/16” nutdriver, attach the two screws (eight screws total) securing each of the four base corner caps to the machine.
6. Using a 11/16” open end wrench, connect lead T2 and associated washers to the electrode stud. See Wiring Diagram.
7. Perform the ***Output Choke Replacement Procedure***.
8. Perform the ***High Frequency Board Replacement Procedure***.
9. Perform the ***Case Cover Replacement Procedure***.
10. Perform the ***Retest After Repair Procedure***.

RETEST AFTER REPAIR PROCEDURE

⚠ WARNING

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

TEST DESCRIPTION

This procedure will aid the technician in testing the output of the Aspect 375 after the repair or replacement of a component or PC board.

MATERIALS NEEDED

Resistive Load Bank
Two Welding Cables - 20 Ft. -4/0
Ammeter and Voltmeter
3 Phase Input Power To The Welder
Wiring Diagram

RETEST AFTER REPAIR PROCEDURE *(continued)*

Table F.36 – Rated output and output range

RATED OUTPUT			
INPUT POWER		DUTY CYCLE	RATED OUTPUT CURRENT AND VOLTAGE
PHASE	VOLTAGE FREQUENCY		
THREE PHASE	200-600/50/60	100%	GTAW 250 A / 20 V SMAW 250 A / 30 V
		60%	GTAW 300 A / 22 V SMAW 300 A / 32 V
		30%	GTAW 350 A / 24 V SMAW 350 A / 34 V
SINGLE PHASE	200-230/50/60	100%	GTAW 180 A / 17.2 V SMAW 180 A / 27.2 V
		60%	GTAW 225 A / 19 V SMAW 225 A / 29 V
		30%	GTAW 225 A / 19 V SMAW 225 A / 29 V

OUTPUT RANGE		
TYPE OF OUTPUT	OUTPUT CURRENT RANGE	MAXIMUM OPEN CIRCUIT VOLTAGE
GTAW AC/DC SMAW AC/DC	2-375 AMPS 5-350 AMPS	108 VOLTS MAX. 90 VOLTS MAX.

PROCEDURE

1. Load output of the welder with a grid load to the input line voltages in Table F.36.
2. Test using the STICK mode loaded output with input set on 3 phase then single phase indicated with an arrow on Table F.36.
3. 230 or 208 VAC which ever is used in your area. See RED arrow for mode and loading in Table F.36.
4. For the 230 or 208 inputs, run the welder for its rated duty cycle of 30% for two 10 minute cycles. On 3 phase input then on single phase.
5. 460 or 575 VAC which ever is the highest voltage in your area. See RED arrow for mode and loading. See Table F.36.

NOTE: Load banking this welder can be tricky, the welder protects itself from overloading if the voltage and current is not close to a welding arc or welding environment. To get close to weld values, set the current to be a 10 to 1 ratio. Example: 200 amps at 20 volts, 300 amps at 30 volts. Most of the time this will produce successful load banking results.

6. Perform the ***Calibration And Verification Procedure***.

CALIBRATION AND VERIFICATION PROCEDURE

⚠ WARNING

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

TEST DESCRIPTION

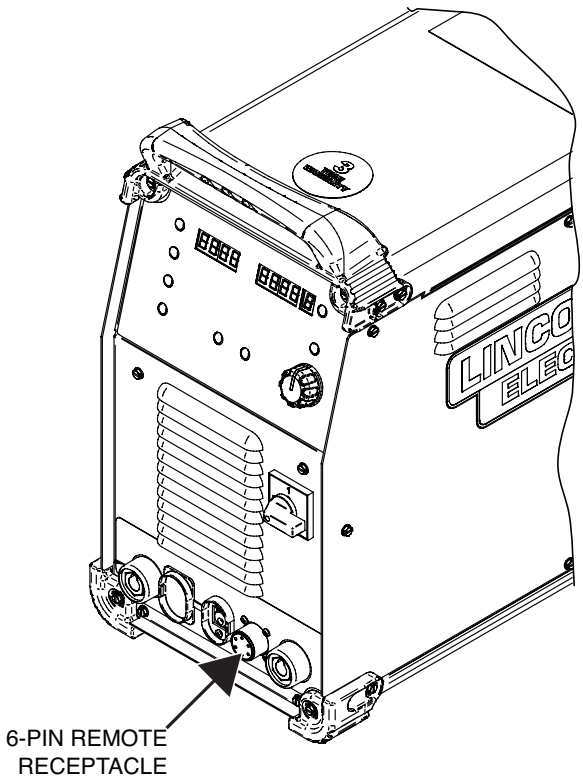
This procedure will aid the technician in checking and, if necessary, adjusting the calibration of the Aspect 375. Calibration should be checked as part of the ***Retest After Repair***.

MATERIALS NEEDED

Resistive Load Bank
Two Welding Cables - 20 Ft. -4/0
Calibrated Ammeter And Voltmeter*
* Calibration inaccuracies due to external metering can and will effect weld performance. Use good quality digital meters that are **calibrated and traceable to National Standards**.

CALIBRATION AND VERIFICATION PROCEDURE *(continued)*

Figure F.119 – 6 pin remote receptacle location



PROCEDURE

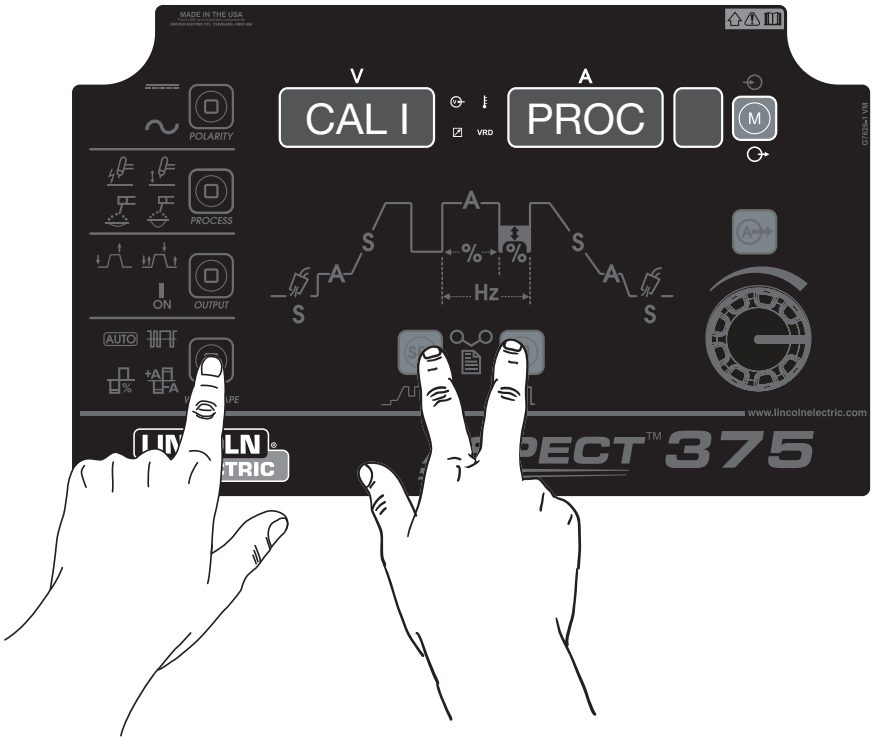
1. Turn the welder OFF.
2. Connect a remote trigger to the 6-pin remote receptacle. See Figure F.119.
3. Carefully apply the correct input power to the machine.
4. Connect the machine output to a 375 amp load (that produces 20V - 26V when applying 375 amps).
5. Connect the volt/ohmmeter, directly across the output terminals of the machine. Connect the ammeter in series with one of the output cables or use a clamp-on style ammeter.
6. Activate the calibration mode by turning on the power switch and immediately pressing the following three buttons together, 'AC Waveshape', 'SEL' and 'Pulser'. Once in the calibration mode the left display will indicate 'CALI' and the right display will indicate 'PROC'. See ***Figure F.120***.
7. To navigate thru the calibration process, using the 'SEL' button will allow you to go to the next logical step, while the 'Pulse' button will allow you to escape back to the previous step, in the event you want to change previous settings.
8. The flow chart is a road map of the calibration sequence. It is recommended that the user be familiar with the general sequence prior to starting the calibration procedure. See ***Figure F.121***.
9. To minimize discrepancy due to various equipment measurement bandwidth, the calibration is only to be performed in DC mode.

CALIBRATION PROCEDURE

1. Verify that the machine is in calibration mode. See ***Figure F.120***.
2. Press the 'SEL' button and the display will prompt you to set the current range to be calibrated. See ***Figure F.122***.
3. Using the knob, adjust the current to the desired setting and press 'SEL' to confirm settings and move to the next step. See ***Figure F.123***. The machine may be set to a default value, such as 375, 275, etc. To improve the accuracy of the machine, it is advised that the current range is set slightly above your overall application range. For example, in your shop, you will use this machine to weld 250 amps, 150 amps and 80 amps on various parts. The recommended calibration would be 275 amps to improve the accuracy of the meters. For this calibration we will use 375 amps for example. See ***Figure F.123***.
4. Enable the output by pressing the 'SEL' button. See ***Figure F.124***.
5. Using a digital voltmeter, check the output at the output studs. Output should be approximately 375 amps. See ***Figure F.125***.
6. Press the 'SEL' button to confirm and move to the next step.
7. Using the knob, the output can be adjusted until the digital voltmeter reads 375 amps. The output can be adjusted to +1 to +50, 0 and -1 to -50. For this calibration it was only necessary to adjust the + adjustment up one and the input reached 375 amps. See ***Figure F.126***.

CALIBRATION AND VERIFICATION PROCEDURE *(continued)*

Figure F.120 – Calibration mode



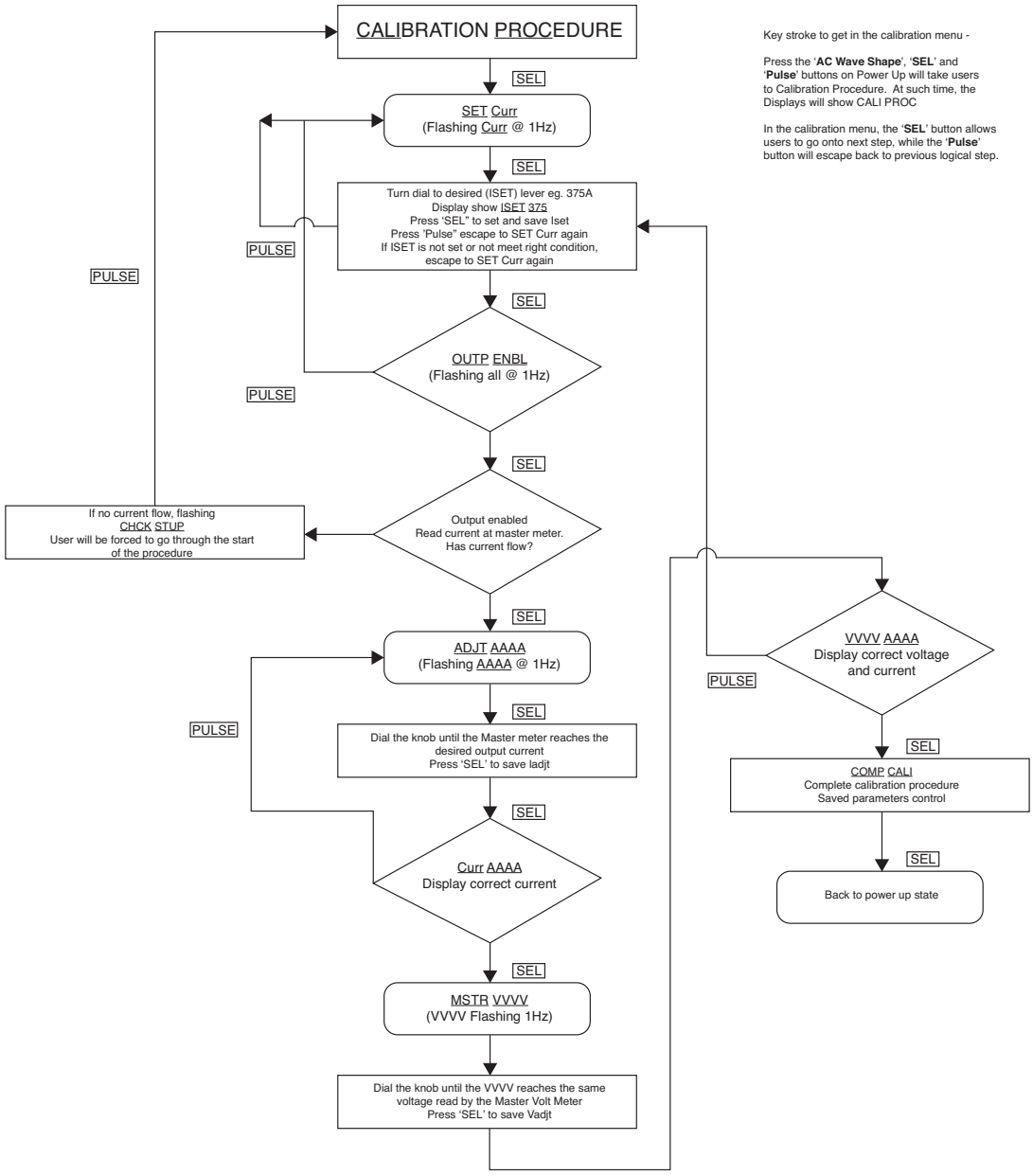
8. Press the 'SEL' button to complete the current calibration. The display will show the current setting. See ***Figure F.127***.
9. Press the 'SEL' button and the display should be similar to ***Figure F.128***. If the display reading is not the same as ***Figure F.128***, this is still acceptable.
10. Using the digital voltmeter, verify that the reading on the voltmeter is the same as the display.
11. If the reading on the display is not the same as the reading on digital voltmeter, use the knob to adjust the voltage reading accordingly to match the external voltmeter reading. Press the 'SEL' button to confirm and move to the next step.
12. The display will now indicate the voltage and current readings, these readings should match your external volt and amp meters. See ***Figure F.129***. The machine is now calibrated.
13. Press the 'SEL' button and the display will indicate that calibration is complete. See ***Figure F.130***.
14. Press the 'SEL' button and the machine will return to the normal power up state. The machine is now calibrated.

VERIFICATION PROCEDURE

1. In accordance with IEC 60974-1, it is necessary to verify the accuracy of the current indicator/meter.
2. Verify that the green power ON indicator is illuminated (not flashing).
3. Connect the grid to the machine.
4. Set the machine to the desired output current and select DC polarity and stick output (for this example we will use 200 amps). The output is now ON.
5. The machine will display the current and voltage readings. The readings should be within +/- 10% of true value. The true value is obtained from the external calibrated meter. For the test example, after the calibration when the preset current is set to 200 amps, the machine outputs at 199.1 amps (as measured by external meter) and the machine displays 200 amps. See ***Figure F.131***. This reading is well within the +/- 10% of the true value (the true value in this case is 199.1 amps, the +/- 10% range will give a range of 179 amps to 219 amps. Since the machine meter reads 200 amps, it is within the IEC standards). This concludes the calibration task.
6. After this calibration, the machine readings for preset verification at 200 amps are displayed. See ***Figure F.132***.

CALIBRATION AND VERIFICATION PROCEDURE *(continued)*

Figure F.121 – Calibration flow chart



AC OUTPUT-REGULATION & DISPLAY CONSIDERATIONS

- Machine regulates and displays average value instead of RMS. For currents 200 amps and lower, RMS value is close to average, higher currents may see 20 - 30 amps higher in RMS.
- When using a clamp meter to measure actual AC TIG welding current, it can get complicated. For example at 250 amps, 120 Hz, AutoBalance settings, a typical true RMS such as Fluke 376 can read 10 amps lower. The same 250 amps setting but AC Waveshape is set for 80% balance, 200 amps EP, 260 amps EN, same meter can read 100 amps lower. To get accurate reading, a meter with (AC + DC) capability, such as Fluke 355, is needed. Meter should be set for (AC + DC).
- Measuring AC stick output is not a problem as stick output is always balanced sine wave at 60Hz. Meter should be set for AC.

Meter accuracy is typically 2.5%.

CALIBRATION AND VERIFICATION PROCEDURE *(continued)*

Figure F.122 – Current range

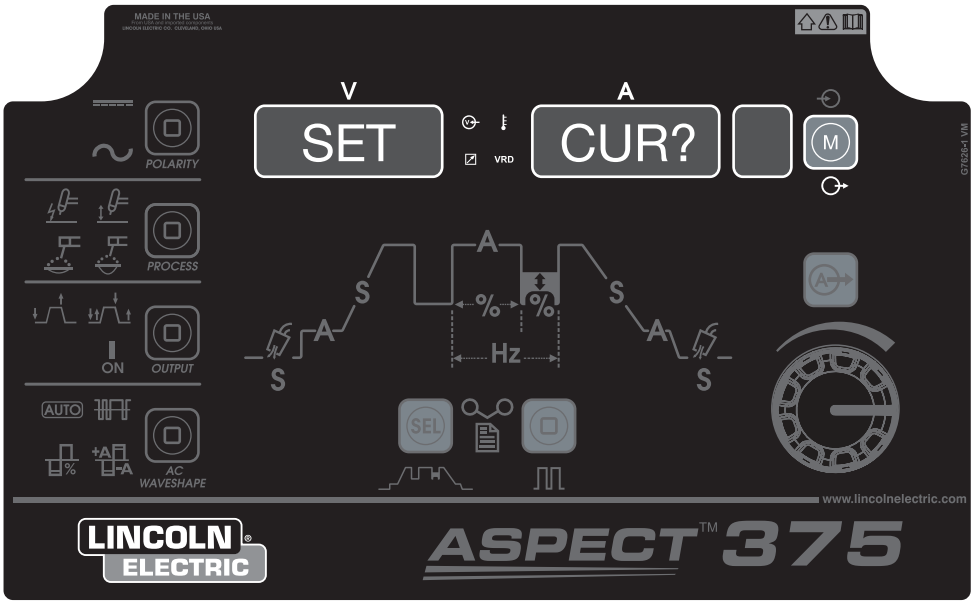
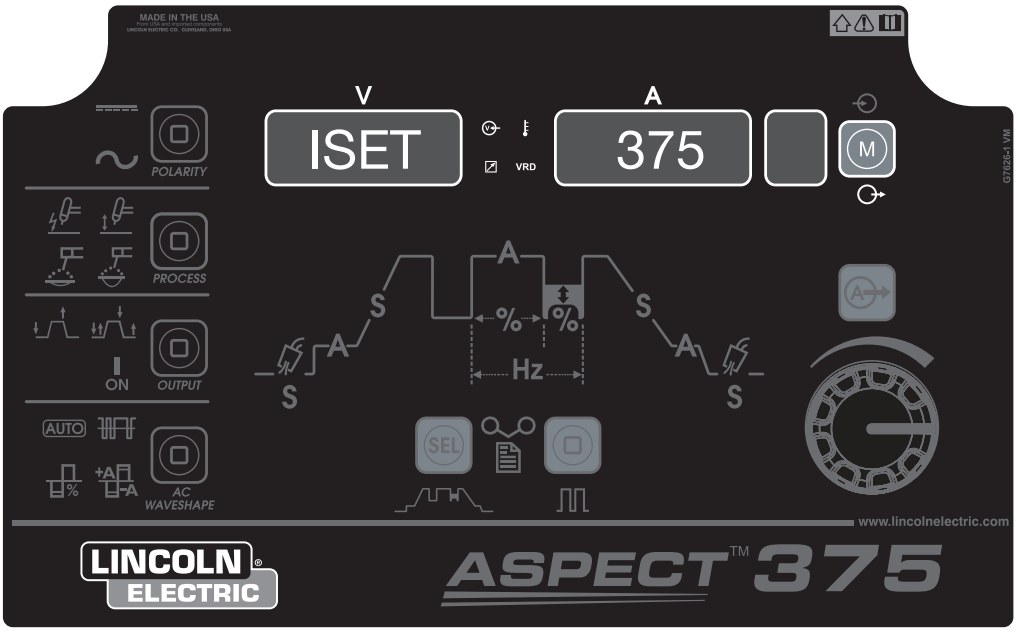


Figure F.123 – Current adjustment



CALIBRATION AND VERIFICATION PROCEDURE *(continued)*

Figure F.124 – Output enable

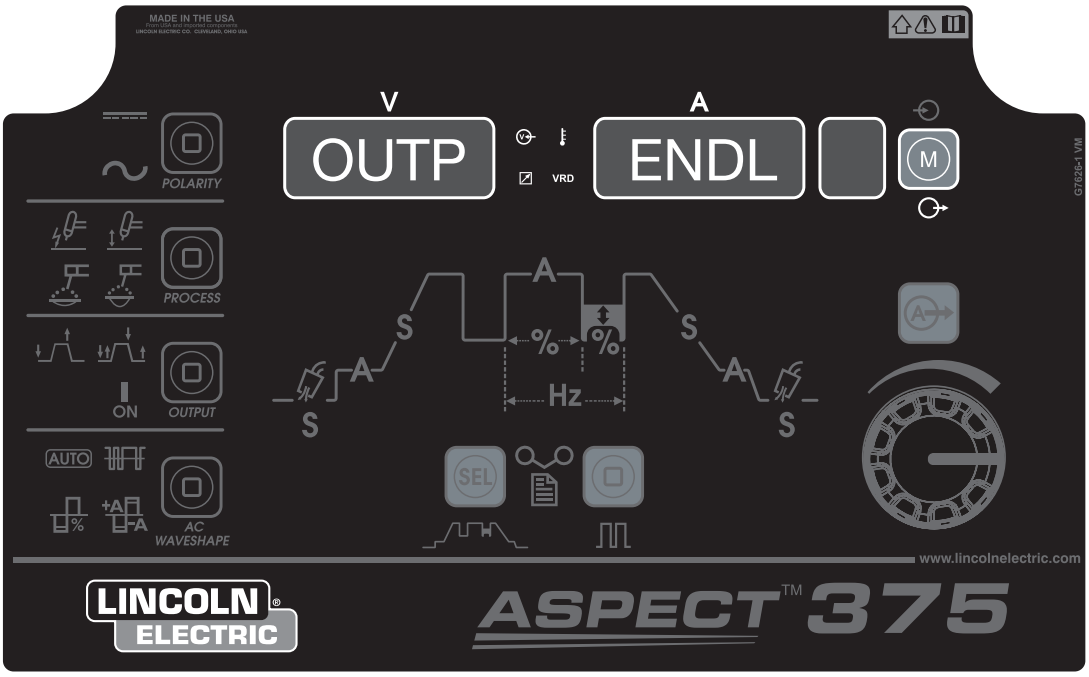
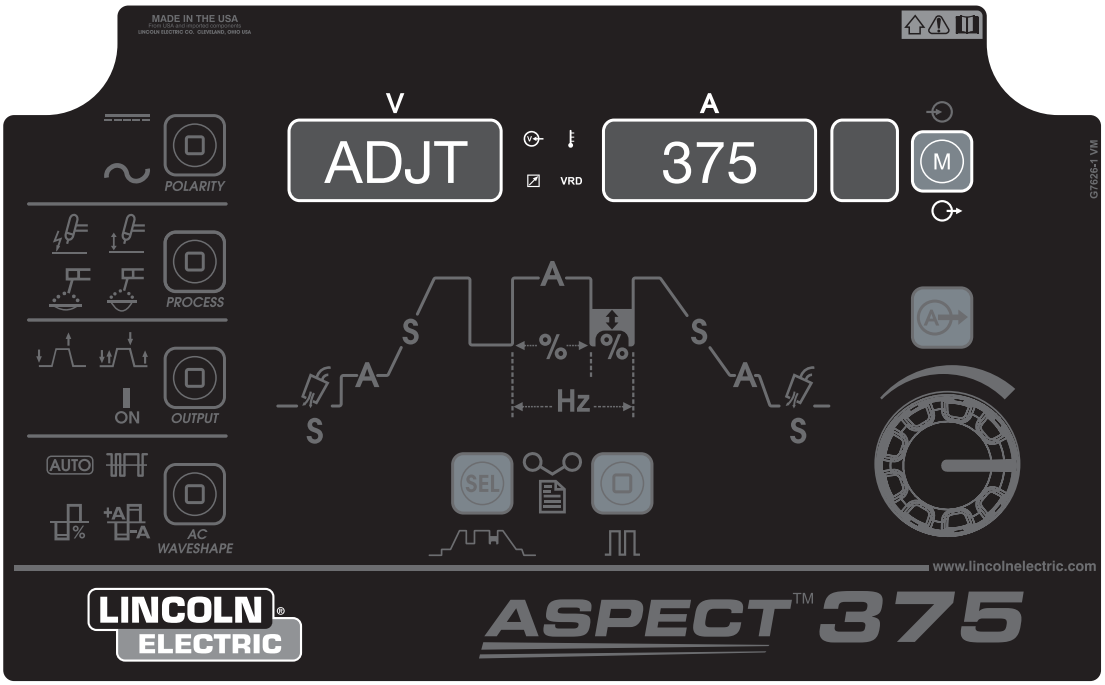


Figure F.125 – Output adjust



CALIBRATION AND VERIFICATION PROCEDURE *(continued)*

Figure F.126 – Output adjustment

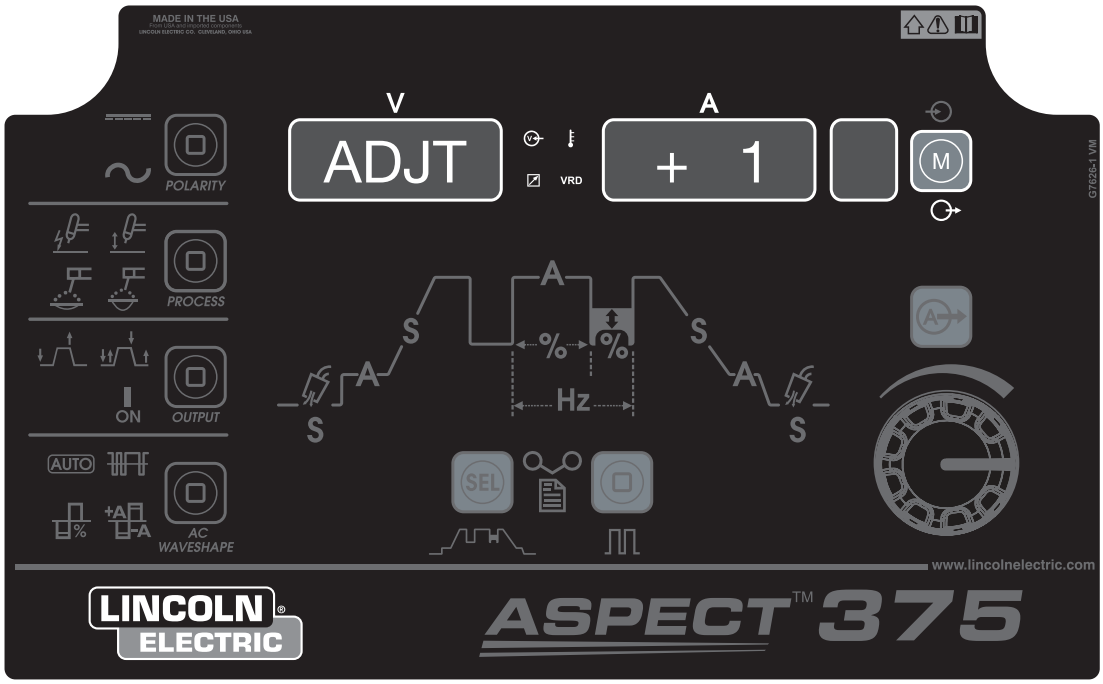
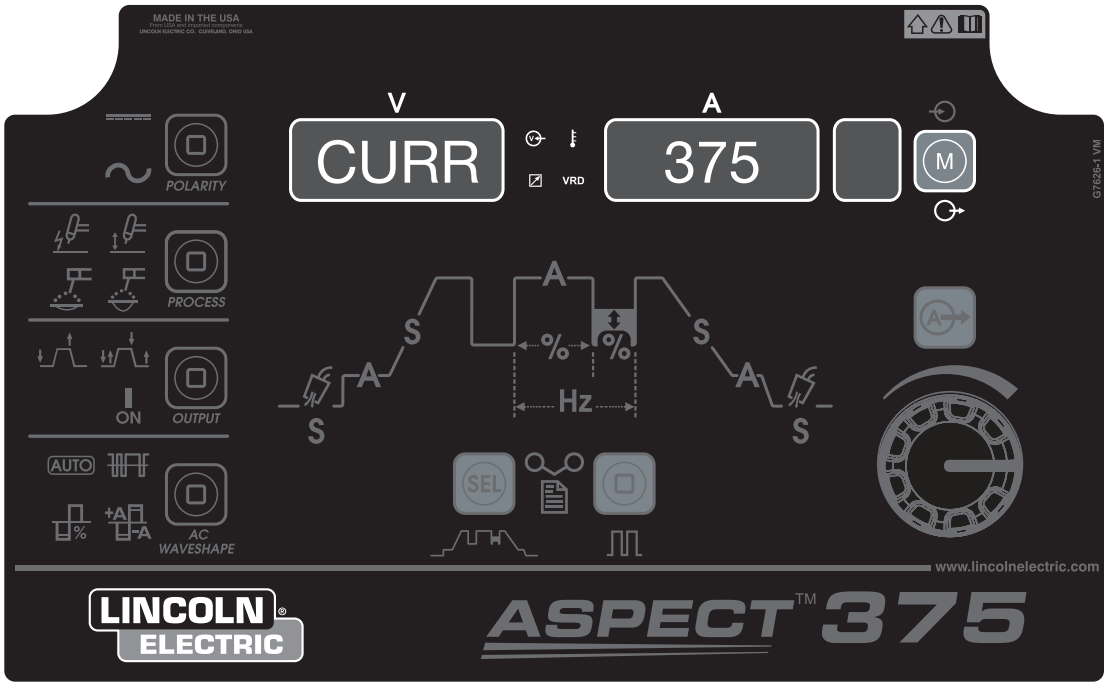


Figure F.127 – Current setting



CALIBRATION AND VERIFICATION PROCEDURE *(continued)*

Figure F.128 – Voltage calibration

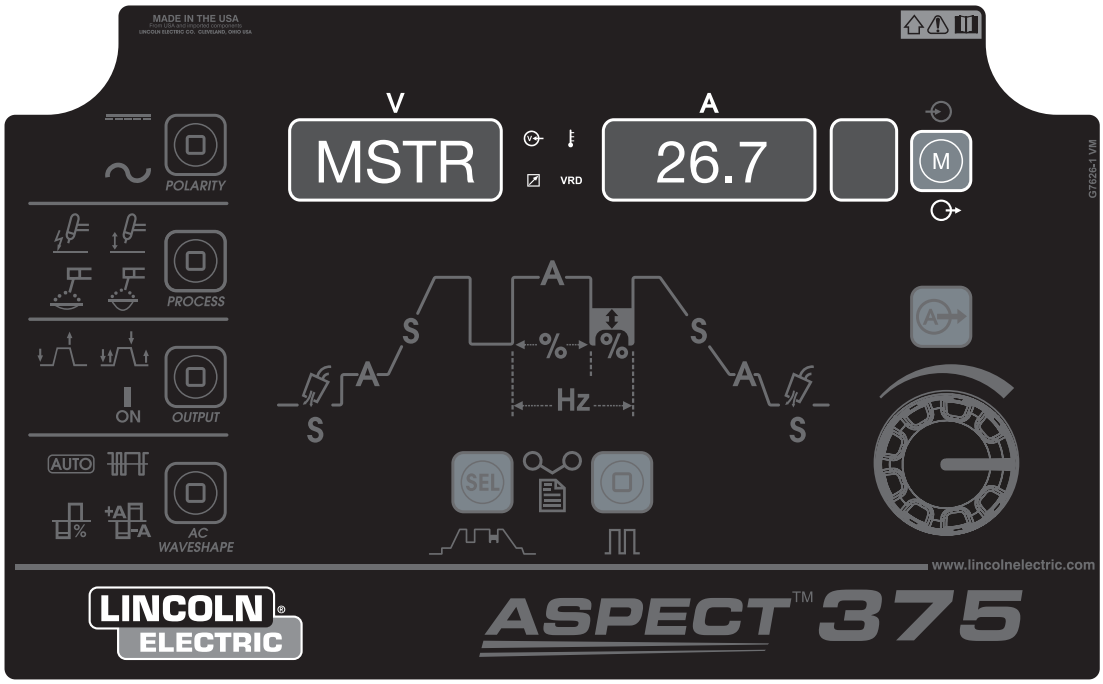
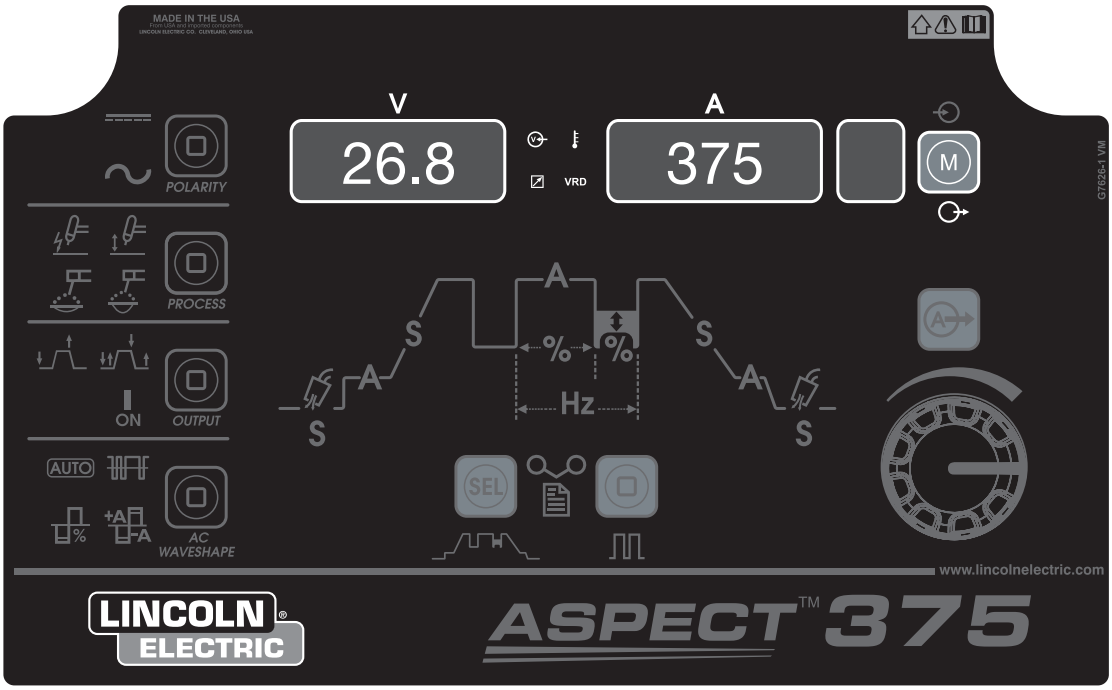


Figure F.129 – Voltage and current readings



CALIBRATION AND VERIFICATION PROCEDURE *(continued)*

Figure F.130 – Calibration complete

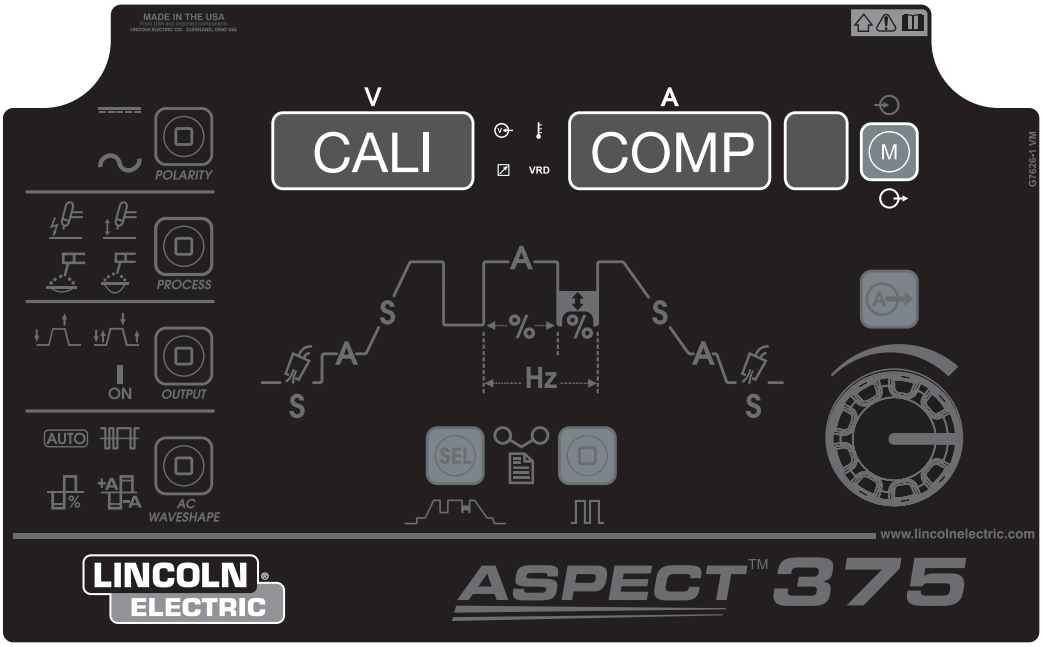


Figure F.131 – True value reading

CALIBRATION AND VERIFICATION PROCEDURE *(continued)*

Figure F.132 – 200 amp preset verification reading

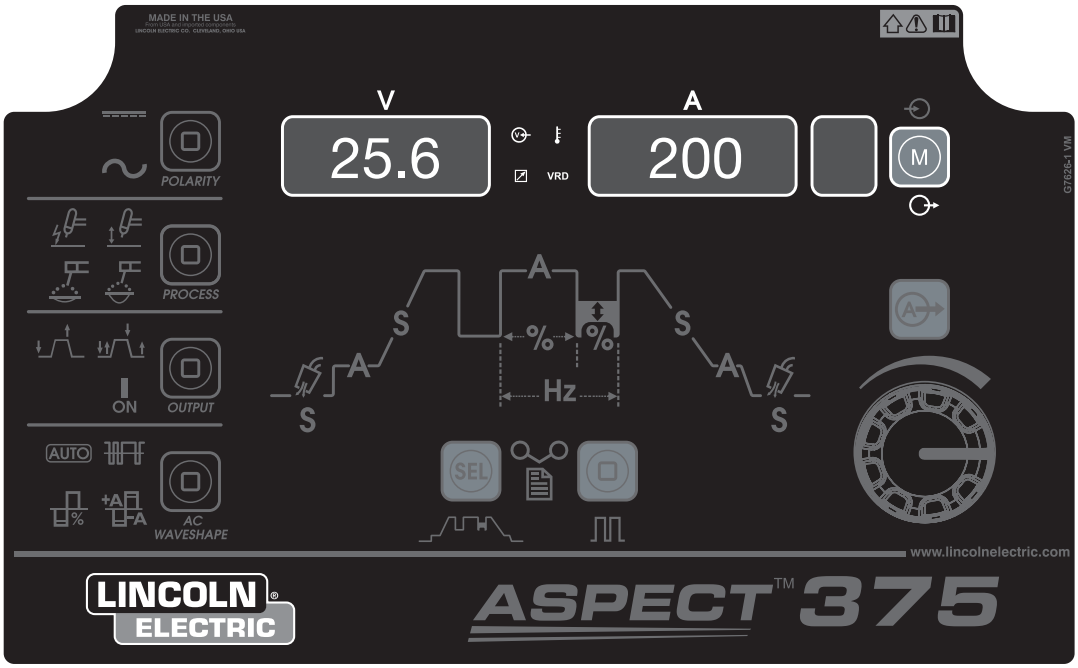
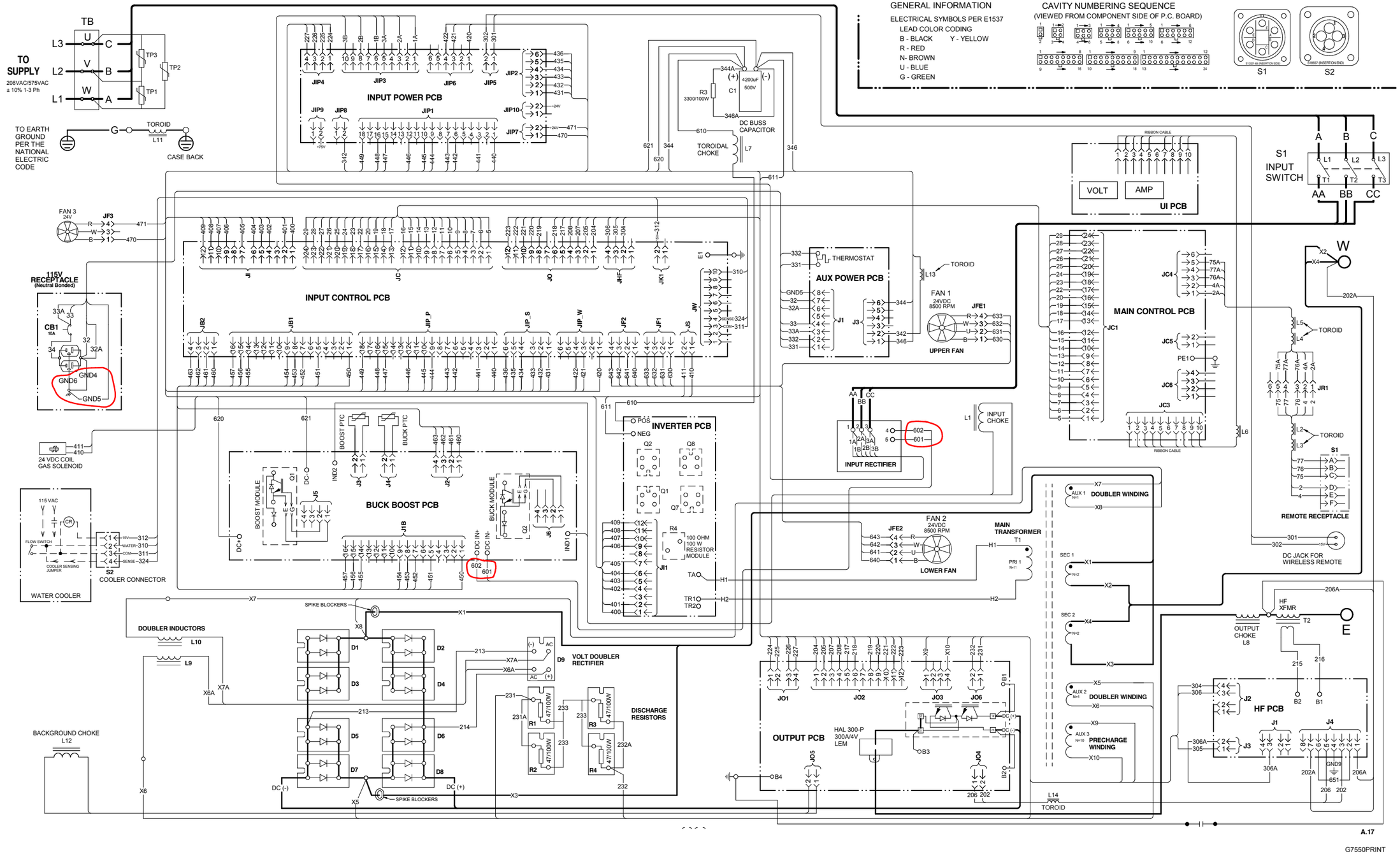


TABLE OF CONTENTS
- DIAGRAMS SECTION -

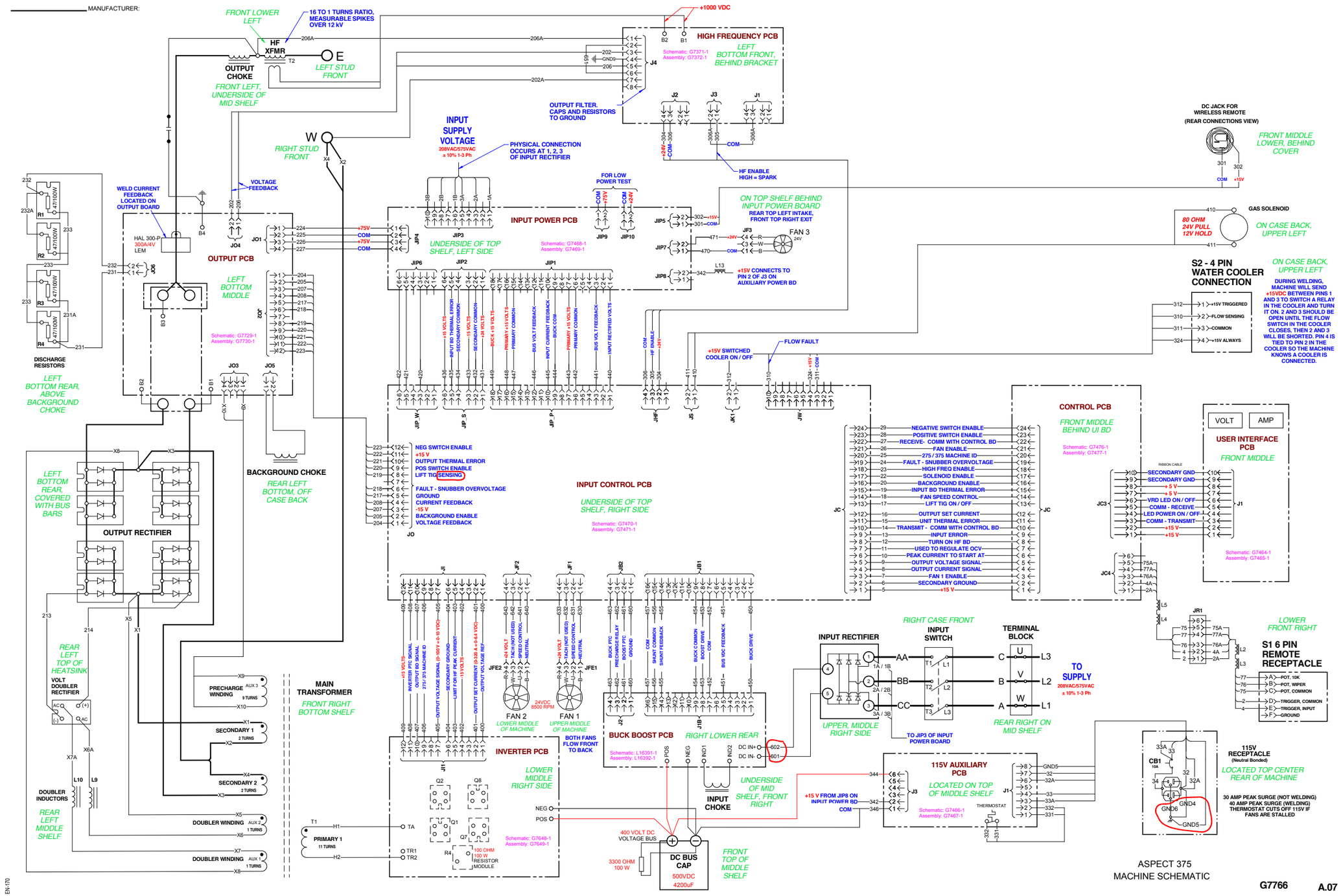
WIRING DIAGRAM - ENTIRE MACHINE - CODE 12165

WIRING DIAGRAM - ASPECT 375



NOTE: This diagram is for reference only. It may not be accurate for all machines covered by this manual. The wiring diagram specific to your code is pasted inside one of the enclosure panels of your machine.

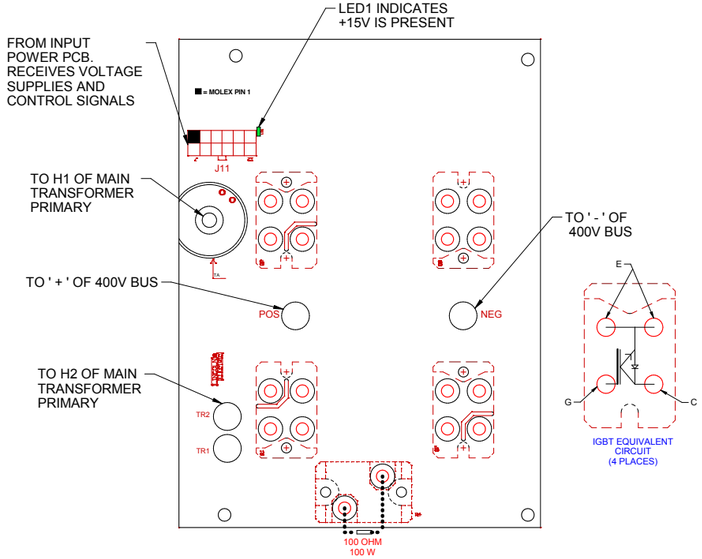
SCHEMATIC - ENTIRE MACHINE - CODE 12165



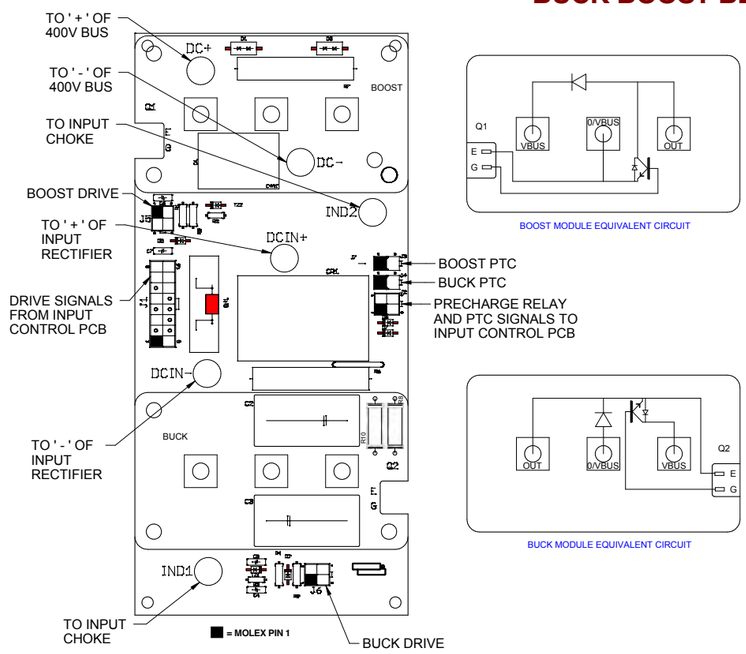
NOTE: Lincoln Electric assumes no responsibility for liabilities resulting from board level troubleshooting. PC Board repairs will invalidate your factory warranty. **Individual Printed Circuit Board Components are not available from Lincoln Electric.** This information is provided for reference only. Lincoln Electric discourages board level troubleshooting and repair since it may compromise the quality of the design and may result in danger to the Machine Operator or Technician. Improper PC board repairs could result in damage to the machine.

PC BOARD ASSEMBLY

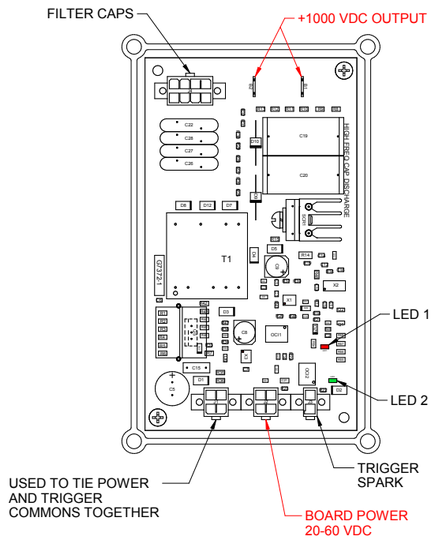
INVERTER BD



BUCK BOOST BD

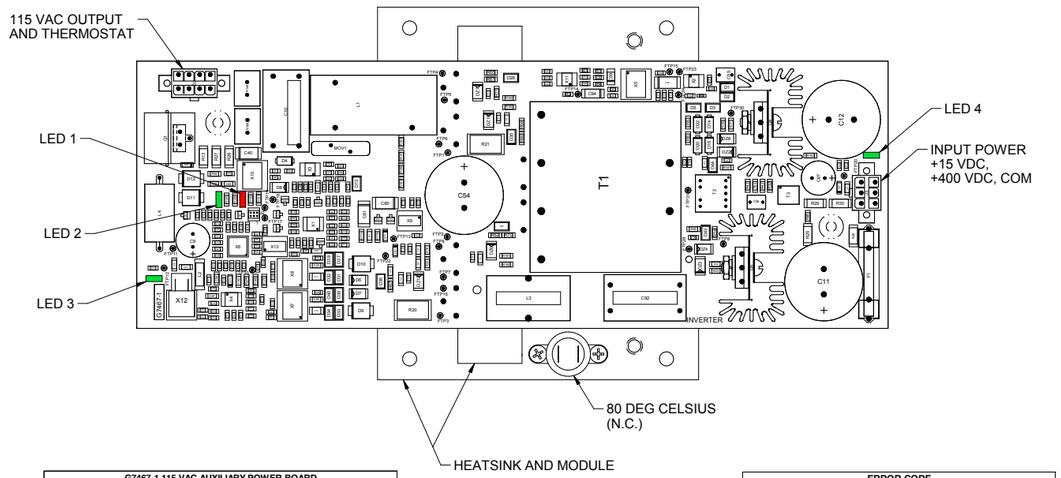


HIGH FREQUENCY BD



G7372-1 HIGH FREQ BOARD		
LED #	COLOR	FUNCTION
1	RED	POWER SUPPLY FUNCTIONAL WHILE TRIGGER ENABLED
2	GREEN	TRIGGER ENABLED

115VAC AUXILIARY BD

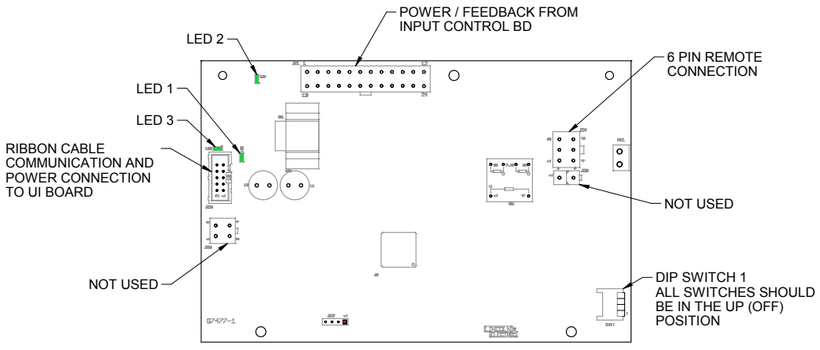


G7467-1 115 VAC AUXILIARY POWER BOARD		
LED #	COLOR	FUNCTION
1	RED	ERROR CODE (LED WILL FLASH CODE)
2	GREEN	LIT WHEN NO ERRORS HAVE OCCURRED
3	GREEN	BOARD POWER SUPPLY IS WORKING
4	GREEN	+15 V INPUT IS PRESENT

ERROR CODE	
ERROR	EXPLANATION
2	THERMAL FAULT
3	15V CONTROL UNDERVOLTAGE
5	OUTPUT OVER CURRENT

EN-170

CONTROL BD

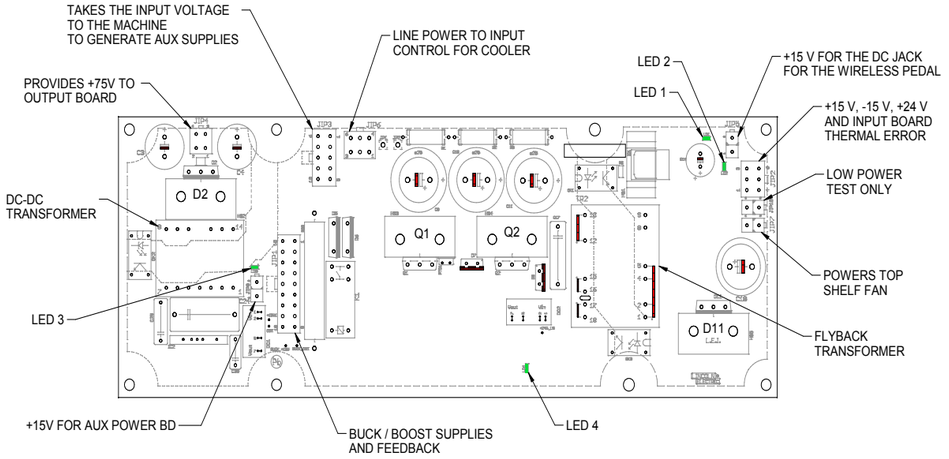


G7477-1 CONTROL BOARD		
LED #	COLOR	FUNCTION
1	GREEN	+ 5 VOLT SUPPLY WORKING
2	GREEN	+ 15 VOLT SUPPLY WORKING
3	GREEN	- 15 VOLT SUPPLY WORKING

NOTE: Lincoln Electric assumes no responsibility for liablilities resulting from board level troubleshooting. PC Board repairs will invalidate your factory warranty. **Individual Printed Circuit Board Components are not available from Lincoln Electric.** This information is provided for reference only. Lincoln Electric discourages board level troubleshooting and repair since it may compromise the quality of the design and may result in danger to the Machine Operator or Technician. Improper PC board repairs could result in damage to the machine.

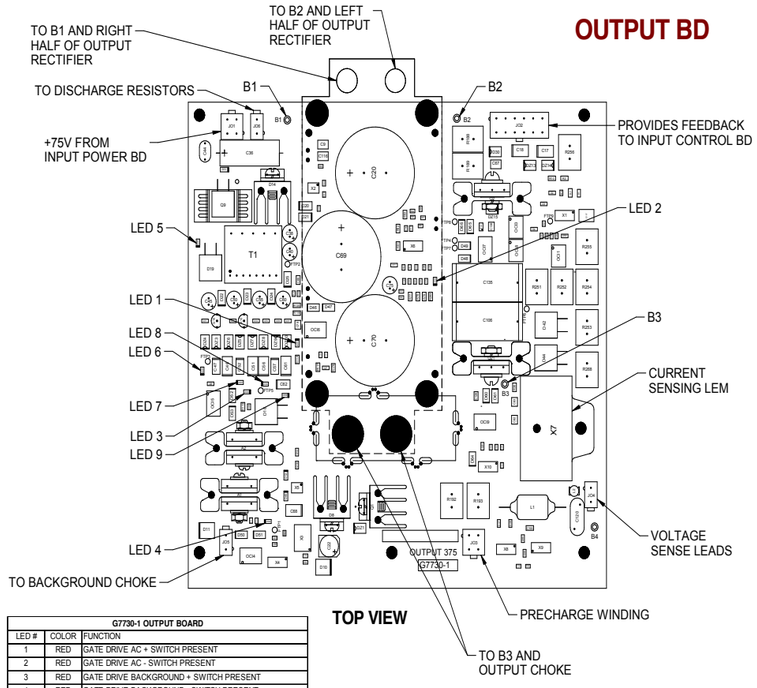
PC BOARD ASSEMBLY

INPUT POWER BD



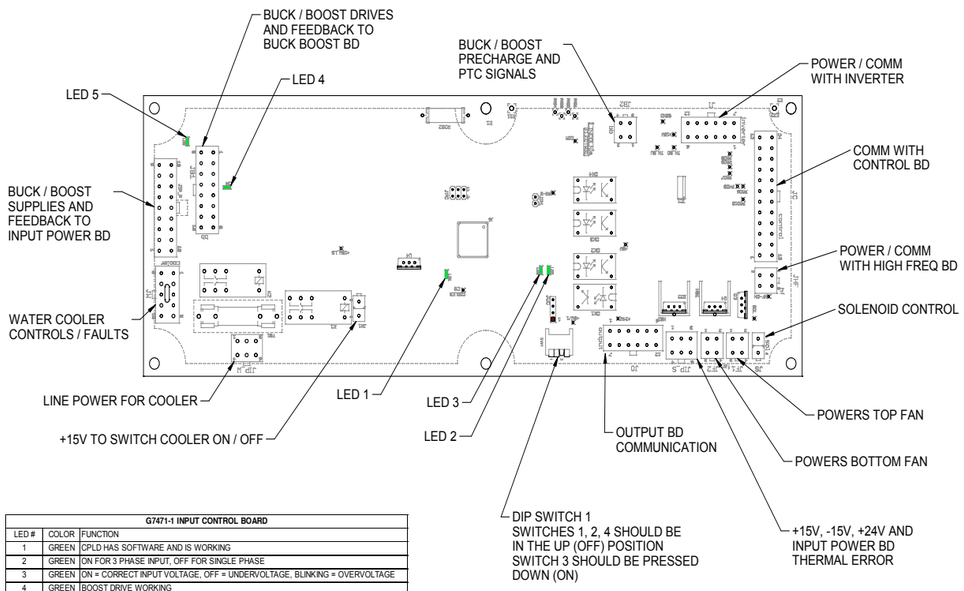
G7469-1 INPUT POWER BOARD		
LED #	COLOR	FUNCTION
1	GREEN	+15 V SUPPLY IS WORKING
2	GREEN	-15 V SUPPLY IS WORKING
3	GREEN	ISOLATED PRIMARY +15 V IS WORKING
4	GREEN	ISOLATED BUCK +15 V SUPPLY IS WORKING

OUTPUT BD



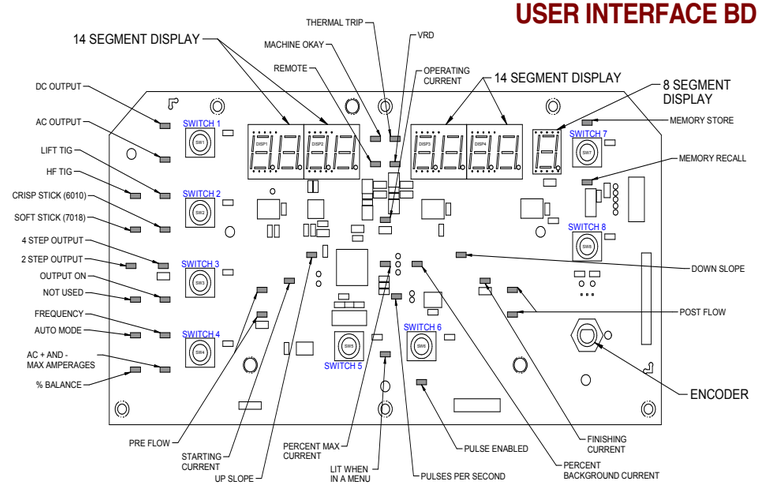
G7730-1 OUTPUT BOARD		
LED #	COLOR	FUNCTION
1	RED	GATE DRIVE AC + SWITCH PRESENT
2	RED	GATE DRIVE AC - SWITCH PRESENT
3	RED	GATE DRIVE BACKGROUND + SWITCH PRESENT
4	RED	GATE DRIVE BACKGROUND - SWITCH PRESENT
5	RED	BACKGROUND +15 VOLT SUPPLY WORKING
6	GREEN	POWER SUPPLY AC + SWITCH WORKING
7	GREEN	POWER SUPPLY AC - SWITCH WORKING
8	GREEN	POWER SUPPLY BACKGROUND + SWITCH WORKING
9	GREEN	POWER SUPPLY BACKGROUND - SWITCH WORKING

INPUT CONTROL BD



G7471-1 INPUT CONTROL BOARD		
LED #	COLOR	FUNCTION
1	GREEN	CPLD HAS SOFTWARE AND IS WORKING
2	GREEN	ON FOR 3 PHASE INPUT, OFF FOR SINGLE PHASE
3	GREEN	ON = CORRECT INPUT VOLTAGE, OFF = UNDERVOLTAGE, BLINKING = OVERVOLTAGE
4	GREEN	BOOST DRIVE WORKING
5	GREEN	BUCK DRIVE WORKING

USER INTERFACE BD



ASPECT 375
MACHINE SCHEMATIC

PAGE 3 OF 3

G7766 A.07

EN-170

NOTE: Lincoln Electric assumes no responsibility for liablilities resulting from board level troubleshooting. PC Board repairs will invalidate your factory warranty. **Individual Printed Circuit Board Components are not available from Lincoln Electric.** This information is provided for reference only. Lincoln Electric discourages board level troubleshooting and repair since it may compromise the quality of the design and may result in danger to the Machine Operator or Technician. Improper PC board repairs could result in damage to the machine.